COMPARATIVE STUDY OF THE SIDDHA DIAGNOSTIC METHODS SPECIALLY *NEERKURI & NEIKURI* WITH MODERN DIAGNOSTIC METHODS IN *NEERIZHIVU MADHUMEHAM* (DIABETES MELLITUS – TYPE 2)

A DISSERTATION SUBMITTED BY

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DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled COMPARATIVE STUDY OF THE SIDDHA DIAGNOSTIC METHODS SPECIALLY *NEERKURI & NEIKURI* WITH MODERN DIAGNOSTIC METHODS IN *NEERIZHIVU MADHUMEHAM* (DIABETES MELLITUS – TYPE 2) is a bonafide and genuine research carried out by me under the guidance and supervision of Prof. Dr. M. Krishnaveni, Professor, Department of Noi Naadal (past) and Head, Department of Udal thathuvam and Prof. Dr. S. Victoria, Head, Department of Noi Naadal, Government Siddha Medical College and Hospital, Palayamkottai, Tamil Nadu, India and the dissertation has not formed the basis for the award of any other degree.

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Certified that I have gone through the dissertation submitted by Dr. Kalaimony Rabindrakumar Vidya dharshini (Reg. No. 321515002) with the tittle, COMPARATIVE STUDY OF THE SIDDHA DIAGNOSTIC METHODS SPECIALLY *NEERKURI & NEIKURI* WITH MODERN DIAGNOSTIC METHODS IN *NEERIZHIVU MADHUMEHAM* (DIABETES MELLITUS – TYPE 2), the student of final DOCTOR OF MEDICINE (SIDDHA), Department of Noi Naadal (Branch – V) of the Government Siddha Medical College and Hospital, Palayamkottai, Tamil Nadu, India. This dissertation does not represent or reproduce the dissertation submitted and approved earlier.

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BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled COMPARATIVE STUDY OF THE SIDDHA DIAGNOSTIC METHODS SPECIALLY *NEERKURI & NEIKURI* WITH MODERN DIAGNOSTIC METHODS IN *NEERIZHIVU MADHUMEHAM* (DIABETES MELLITUS – TYPE 2), is a bonafide work done by Dr. Kalaimony Rabindrakumar Vidya dharshini (Reg. No. 321515002), Government Siddha Medical College and Hospital, Palayamkottai, Tamil Nadu, India in partial fulfilment of the requirement of the University rules and regulations for the award of the degree of DOCTOR OF MEDICINE (SIDDHA), NOI NAADAL (Branch - V) under my guidance and supervision during the academic year 2015 - 2018.

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LIST OF ABBREVIATIONS

NR	*Neerizhivu Madhumeham*
DM	Diabetes mellitus
WHO	World Health Organization
IDF	International Diabetes Federation
IDDM	Insulin dependent diabetes mellitus
NIDDM	Non - insulin dependent diabetes mellitus
MODY	Maturity onset diabetes of the young
HbA1c	Glycated haemoglobin A
OPD	Outpatient department
IPD	Inpatient department
GSMC	Government Siddha Medical College
GDHH	Government District Headquarters Hospital
GSV	Gopalasamudram village
FBS	Fasting blood sugar
PPBS	Postprandial Blood sugar
SPSS	Statistical Package for the Social Science
SGOT	Serum glutamic-oxaloacetic transaminase
SGPT	Serum glutamic pyruvic transaminase
SD	Standard deviation
n	Number of subjects

CHAPTER 1

INTRODUCTION

Siddha system of medicine is one of the oldest systems of medicine in the world, originated and developed by the Siddhars (Ivy and Malini, 2010). Thirumoolar is considered as the Emperor of Siddha system of medicine and he was a Tamil Shaivite mystic and supernatural writer. He is considered as one of the 63 *nayanars* and one of the 18 *Siddhars*. He is the author of the famous literatures *Thirumanthiram* and *Saiva Siddhantam* which is framed the basic principles of Siddha system (Wikipedia, 2013). His principles on Siddha system are astonishing. Further his book *Thirumoolar vaithiyam* (*Karukadai* 600) is one of the valuable medical book in Siddha system of medicine. Versions of Thirumoolar are certainly suitable for the contemporary modern world with stress and strain.

‘இருமியபித்தமும் வாதமும்கூடில்
மருவச்சலமேகம் வாரிதிபோலோடும்
உருவமும்வேறாகு முண்டவுடற்காயும்
உருகியமூளையுறிஞ்சியி னிக்குமே’

(*Thirumoolar vaithiyam karukkadai* – 600, verse 83)

The above verse expressing the aetiology, sign and symptoms of *Neerizhivu Madhumeham* (NR). Increased *Pittham* and *Vatham* are the main causes for the NR. The above verse indicates the sign and symptoms as, increase output of the urine like a heavy rain and sweet substances pass with urine. Changes occur in the body structure. Further arise feeling of hunger as immediate as had meals. The aetiology, sign and symptoms of NR is similar to that of *Madhumeham* (Thirumoolar vaithiyam (Karukadai 600) indicating the possibility that NR may consider as *Madhumeham*. In addition NR may compare with diabetes mellitus (DM) in Allopathic system of medicine because the sign and symptoms of DM as polyuria, weight loss and polyphagia (Baynest, 2015) are overlapping with NR.

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both (Ozougwu, 2013).

The World Health Organization (WHO) estimated that diabetes resulted in 1.5 million deaths in 2012, making it the 8th leading cause of death (WHO, 2013). In 2014, the International Diabetes Federation (IDF) estimated that diabetes resulted in 4.9 million deaths (IDF, 2014). More than 80% of diabetic deaths occur in low and middle-income countries (Mathers and Loncar, 2006).

A number of diagnostic methods have been using in various systems of medicine globally. Siddha system has unique assessment methods as *envagaithervu* (*naadi, sparism, naa, niram, mozhi, vizhi, malam and siruneer*), *neikuri* and *manikkadai* to diagnose and prognosis of the diseases (Natarajan, 2009; Shanmugavelu, 1967).

Lack of user friendly modern scientific technologies and little usage of Siddha diagnostic methods have led to non-familiar of these diagnostic methods among the healthcare and scientific community. A little brief studies observed in DM with siddha diagnostic methods. Although elaborate comparative study on NR with Siddha diagnostic methods specially with *neerkuri*, *neikuri*, *naadi* and *manikkadai* has not been studied previously to the best of my knowledge. It is essential to give a scientific validation to the Siddha diagnostic methods for NR to the effective reuse of in clinical practice.

Therefore the current study was designed to test the interactions between the NR and Siddha diagnostic methods specially *neerkuri* and *neikuri* and also compares it with modern diagnostic methods to bring out the significance of the knowledge obtained from the Siddha system of medicine.

CHAPTER 2

AIM AND OBJECTIVES

2.1 Aim

To evaluate the diagnosis and prognosis of NR using Siddha diagnostic methods.

2.2 Objectives

2.2.1 Primary objective

To study the interactions between the NR and *neerkuri & neikuri* and compare it with modern diagnostic methods.

2.2.2 Secondary objectives

1. To study the correlation between NR and *naadi*.
2. To test the link between NR and *manikadai*.
3. To demonstrate the prognosis of NR using *neerkuri, neikuri, naadi* and *manikadai*.
4. To observe the changes of *neikuri* after the intake of anti *Neerizhivu Madhumeha* drugs.

CHAPTER 3

LITERATURE REVIEW

Neerizhivu madhumeham – Neerizhivu + mathumeham means excessive sweet taste urination (Sambasivam pillai, 1998).

3.1 Neerizhivu madhumeham and different names

3.1.1 Neerizhivu madhumeham

The *Thirumoolar vaithiyam karukkadai* 600 reveals that the increased *Vatham* and *Piththam* are the main factor for NR.

‘இருமிய பித்தமும் வாதமும்கூடிடில்
மருவச்சலமேகம் வாரிதிபோலோடும்
உருவமும் வேறாகு முண்டவுடற்காயும்
உருகியேமூளையுறிஞ்சி யினிக்குமே’

(*Thirumoolar vaithiyam karukkadai* – 600,verse 83)

The above verse indicates when increase *Piththam* which combined with *Vatham*, cause increase output of urine like heavy rain and sweet substances eliminate with urine. Changes occur in the body structure. Further the feeling of hunger will arise as immediate as after having meal.

3.1.2 Other names of Neerizhivu madhumeham

The following verse indicating the aetiology as well as the sign and symptoms of the *madhumeham*.

‘இனிக்கின்றவாதத் திடைச்சேரிலையந்தான்
பனிக்கின்றகள்ளுப் பதனிபோல் நீரோடும்
கனிக்கின்றமேனி கரைந்துவெளுப்பேறும்
தனிக்குமதுமேகம்தப்பாமலையமே’

(*Thirumoolar vaithiyam karukkadai* – 600, verse 84)

The verse reveals, when the combination of *Vatham* and *Iyam*, the urine will be in sweet taste as '*pathaneer'*. The body will emaciate and change to pallor.

The above literature (*Thirumoolar vaithiyam karukkadai* – 600) reveals that sign and symptoms of NR is similar with the sign and symptoms of *madhumeham* reveal as the NR is nearly equal to *madhumeham*.

Ramachandran (2000), Sambasivam pillai (1998) and *Yuki vaiththiya kaviyam* (2014) documents the sign and symptoms of the disease *neerizhivu*. Ramachandran (2000) documents the sign and symptoms of *neerizhivu* as emaciation, pallor of the body and eye, sweating, ache and pain, dryness of the face, hand, leg and chest, thirsty, tiredness, fatigue, increase sleep during the day and night, loss of appetite and excessive urination.

Sambasivam pillai (1998) documents, the meaning of *neerilizhu* is excessive urination.

The *Yuki vaiththiya kaviyam* states the sign and symptoms of *neerizhivu* as,

' முகமுங்காந்திநெஞ்சலர்ந்து முறிந்தவுடலுநடுநடுங்கி
நகமேலறிந்து நாவறண்டு நஞ்சுண்டவர்போல்மிகச்சோர்ந்து
பகலுமிரவிமிரங்கியுடல் பரிந்தேதட்டிமெலிந்துழன்று
மிகவேதவனமுண்டாகி வேண்டாததன்னம் வேண்டாதே'

'மெய்யேவேர்க்குமுடல்நாறும் விழியேபலகால்மிகமூடி
கைகாலெந்துநாவுலர்ந்து கமலமுகமும்வெளுவெளுத்து
ஐயோவுடம்புநோகுதென்பார் அயர்ந்துகிடப்பார்கண்காண
பொய்யேதவனமுண்டாகும் பொருந்தாதன்னம்பொருந்தாதே'

(*Yuki vaiththiya kaviyam*, verse 787 -788)

The verse 787 (first) documents burning sensation of face, dryness of chest and mouth, tremor in the body, fatigue, increase sleep during day and night, emaciation, ache and pain in the body and loss of appetite. The second verse indicates as sweating,

odour in body, excessive sleep, ache and pain in arm and leg, dryness of mouth, pallor of face like lotus, ache and pain in the body, tiredness and loss of appetite.

In addition *Dhanvanthiri sootchuma vaithiyam 200 visha bethi vaiththiyam* (2015) mentions that, the taste of the urine is sweet.

‘ **…..** மகத்தான நீரிழிவு தித்திப்பு நீரே…..’

(*Dhanvanthiri sootchuma vaithiyam 200 visha bethi vaiththiyam*, verse 187)

One of the text book *Dhanvanthiri vaiththiyam* II (2015) documents a disease, *salamegam*.

‘பெருகிய சலமேகத்தின் குணந்தனைப் பேசக்கேளாய்
மருவியநீ ரருவிபொலே வந்திடுந் தாகமுண்டாங்…..’

(*Dhanvathiri vaiththiyam* II, verse 24)

The above verse states the sign and symptoms of the disease as, excessive urination and thirst. The sign and symptoms of the above diseases are nearly equal to NR.

3.2 General characters of *neerizhivu*

Meha noi, Soothaga nool mattrum arivaiyar sinthamani (2008) expresses the general characters of *neerizhivu*.

‘பாருமே நீரிழிவு இருபதுக்கும்
பகரு பொதுக் குணமது தான் சொல்லக் கேளு
நேருமே தாகமொடு தளர்ச்சை மூர்ச்சை
நெடும் இடுப்புளைவுடனே எலும்பு நோகும்
சேருமே இருமலொடு இழைத்த மூச்சு
சிறப்பான ஆகாரம் அதிகம் வாங்கும்
ஆருமே அருசியொடு பிரம்மை விக்கல்
அழலோடு எரிவு மன கலக்கம் சோம்பல்’

‘சோம்பியே தேகமதில் உளச்சல் நோவு
சிறப்பாக உறக்கமின்றி உடலும் தேம்பி
தேம்பியே காற்று ஏட்க அதிக ஆசை
திறமாக மேல்மூச்சே வாயு போகும்
ஓம்பியே தேகமது விளறிப் போகும்
உறும் மயக்கம் ஆயாசம் மெலியும் தேகம்
வெம்பியே சிறு நீரும் அதிகம் போகும்
விளங்கும் நீரிழிவின் குணம் தான் காணே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 119-120)

The above stanza states excessive thirst, giddiness, back ache for long time, bony pain, cough with difficulty in breathing, excessive intake of food, loss of taste, hiccough, burning sensation, mind disturbance, laziness, ache and pain with tiredness, loss of sleep, difficulty in breathing, pallor of body, loss of consciousness, fatigue, emaciation and excessive urination as the general characters of *neerizhivu*.

3.3 Types of *neerizhivu*

Different types of *neerizhivu* were documented in literature. Differences noted in the classifications of *neerizhivu* among the literature. Twenty types of *neerizhivu* were mentioned in *Meha noi, Soothaga nool mattrum arivaiyar sinthamani* (2008) and *Yuki vaiththiya kaviyam* (2014). Ramachandran (2000) documents twenty four types of *neerizhivu*.

Classification I

Types and characters of *neerizhivu* according to *Meha noi, Soothaga nool mattrum arivaiyar sinthamani* given below.

1. *Mahenthira varni*

‘என்றும் இனி மகேந்திர வர்ணி செய்கை
ஏற்ற சலம் நெய் போலே வடியும் பாரு
நன்றாக துணிதனில் நனைத்து தீ யில்
நீ கொளுத்தினால் தீ எரியும் விளக்கு போலே
குன்றியே தேகமது மெலிந்து போகும்
கொடும் தாகம் அஸ்தியிலே கூடுண்டாகும்
துன்றாமல் பதினாழி சலம் தான் போகும்
துடரும் மகேந்திர வர்ணி குணமிதாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani* , verse 134)

Urine passes like ghee. If you soak a piece of cloth in that urine and fire, it will burn like a lamp. Emaciation, severe thirst, feeling heat in bone and specially *pathin naazhi* (5600g – (1 *naazhi* = 560g) of urine passes at a time.

2. *Inthira varni*

‘விளங்கவே இந்திர வர்ணி குணத்தை சொல்வேன்
விளங்கு சலம் கோ சலம் போல் நிறமேயாகும்’
தளங்கறவே கோ சலத்தின் நாற்றம் காணும்
தப்பால் காச்சினால் எரியும் தீ தான்
அளங்கறவே ஆயாசம் தளர்ச்சையுண்டாம்
அழகு முகம் தான் மெலியும் கன்னம் ஒட்டும்
களங்கமற வேளைக்கு படிதான் நாலு
காணுமென முன்னோர்கள் கூறினாரே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 136)

Colour and odour of the urine resembles as cow’s urine and burn when fire. Tiredness, weakness, narrowness in the face, emaciation and passing 4 *padi* (5.2 L – (1 *padi* = 1.3 L) urine passes at a time

3. *Ruththiranga varni*

‘சொல்லுமே ருத்திராங்க வர்ணி தோன்றில்
சேர்ந்த சலம் கோசலம் போல் வர்ணமாகும்
வெல்லும் மாமிச வாடை மிக உண்டாகும்
விளங்க அதை காய்ச்சினால் தேன் போல் வாடை
நில்லு இளம் வாலிபனும் கிழவன் போலாம்
நிறை அஸ்தி தான் வேகும் பனியுண்டாகும்
அல்லவே வேளை நானாழி நீரு
அணுகுவதும் நிசமென அறியலாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 138)

Urine resembles as cow’s urine. Flesh odour present in the urine and honey smell when heat the urine. Young appearance of the body change in to old. Destruction of bone and blood present in urine or 4 *naazhi* (2240 g) urine passes at a time.

4. *Sooththira varni*

‘திண்ணமுற சூத்திர வர்ணி செய்கை
திறம் ஆட்டின் கொழுப்பது போல் நீர் தானாகும்
வண்ணமுற காய்ச்சினால் ஆட்டின் நெய் போல்
வற்றினால் கரும்பின் நீர் வாசம் காணும்
எண்ணமுற லிங்கத்தில் எரிவுகுத்து
எழுந்த சுரம் தாகம் அரோசியம் வாந்தி
நிண்ணியமாய் நாளொன்றில் குறுணி சாயும்
நீ அறிவாய் சூத்திரனாம் வர்ணி தானே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 141)

Urine passes like goat’s fat. The urine seems as goat ghee and smell as sugar candy juice, when reducing the volume by boil. Burning sensation and pain present in genital region. Fever, thirst, aversion for food and vomiting present. Passing 1 *kuruni* (5.376 L – (1 *kuruni* = 5.376 L)) urine at a time.

5. *Vishba piraban*

‘சாற்று விஸ்ப பிறபனதின் குணம் ஏதென்றால்
சலியாமல் நீர் நிறம் தான் யானையின் தன்
போற்று மூத்திரம் போலே வர்ணமாகும்
பொருந்து மணம் அது போலாம் காய்ச்சி பார்த்தால்
மாற்றுமதில் உப்பு உறையும் ஒரு போலே
மனம் தளரும் உடல் அயரும் மெலியும் தேகம்
தோற்றும் ஒரு வேளைக்கு படி நானாழி
தோகையரே நீரிறங்கும் தொகுத்து சொல்லே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 144)

Colour and odour of the urine is like that of an elephant urine. Salt sedimentation is seems when boiling the urine. Tension, tiredness and emaciation present. Passing 4 *naazhi* (2240 g) urine at a time.

6. *Thirkentha vaahini*

‘பாருமினி துர்கெந்த வாகினியின் செய்கை
பகருகிறேன் பாரிலுள்ளோர் அறிய வேண்டி
சாருமினி சிறுநீர் கற்றாழை சாறு போல்
சலியாமலே நாறும் மோர்ந்து பாரு
வாருமதை தான் காய்ச்சினால் பிண நாற்றம் போல்
வாடையுறும் தாதயரும் ஒளியும் மங்கும்
நேரும் ஒரு வேளை நானாழி நீரு
நெகிழும் துர்கெந்த வாகினிக்கென்றே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 146)

Aloe odour present in urine and the smell change in to the odour of a death body when boiling the urine. Impotency and loss of brightness of the body presence. Four *naazhi* (2240 g) urine passes at a time.

7. *Sampeera varni*

‘செப்பக்கேள் சம்பீர வர்ணி தோன்றில்
சிறப்பாக நீரு சுண்ணாம்பு நாறும்
ஒப்பாகவே தெளிய வைத்து பார்த்தால்
உறு மண்டி அடியில் சுண்ணாம்பு காணும்
தப்பாமலே நாறும் எறும்பரிக்கும்
தான் அதனை காய்ச்சினால் சுண்ணாம்பாகும்
மெப்பாமவே வேளைக்கு படி நானாழி
மேவும் இதின் செய்கை என விள்ளலாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 148)

Odour of the urine likes as lime stone and present in whole time. Lime stone sedimentation available at the bottom of the vessel when keeping without shake. Availability of ants at the place of urination, notable. 4 *naazhi* (2240 g) urine passes at a time.

8. *Madhuppravaahini*

‘திண்ணமுறும் மதுப் பிறவாகினியின் செய்கை
திறமாகவே நீர் மஞ்சள் நிறமாய் காணும்
வண்ணமுற பீசமுடன் கோசம் நோகும்
வளமாக அடிக்கடி தான் நீரு போகும்
எண்ணமுற அந்நீரில் மாவு போலே
இதமாக உறைந்திருக்கும் வெளுக்கும் தேகம்
நிண்ணயமாய் அழககலும் வேளை ஒன்று
நீ அறிவாய் உரியி நீர் வடியும் காணே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 150)

Urine appears as yellow in colour and flour like substance present in urine. Feeling of pain in testicles and body. Intermittent urination and pallor of the body present.

9. *Salappravaahini*

‘விட்டு போம் சலப் பிறவாகினியின் செய்கை
விளங்கு ஜலம் படிக நிறமாக காணும்
தொட்டுடனே பீசமும் முதல் கோசம் நோகும்
தாழை விளிர் சாற்றினுட நிறமாம் நீரு
கட்டுடனே காய்ச்சினால் சீழு நாறும்
காணுமே வேளைக்கு நாழி நீரு
மட்டுடனே முகமும் வாடும் மேனி குன்றும்
மதித்த அஸ்தி தான் காயுமிது வாறிதாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 152)

Transparent urine like as glass available. The colour changes to white and foul smell noted when heating the urine. Pain present in testicles and body. Dullness present in face and emaciation occur. Destruction of bone also present. One *naazhi* (560 g) urine passes at a time.

10. *Reththa jalakkini*

‘விரும்பியதோர் இரத்த ஜலாக்கினியின் வாறு
விளம்புகிறேன் உலகோர்கள் அறிய வேண்டி
நரும்பு நீர் முயல் ரெத்தம் போலே காணும்
நலமாக காய்ச்சினால் புலாலும் நாறும்
அரும்பியே பீசமுடன் கோசமும் நோகும்
அடரும் உடல் மெலியும் மிக அழலும் மீறும்
தரும்பு மொரு வேளைக்கு படிதான் ரண்டு
சாயுமே நீரதுவும் சாற்றலாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 154)

Urine resembles as rabbit blood. Flashy odour presence when boil the urine. Pain present in testicles and body. Emaciation occurs and increase *piththam*. Two *padi* (2.6 L) urine passes at a time.

11. *Sukkila pravaahini*

‘உண்ணு சுக்கில பிறவாகினியின் செய்கை
உற்றுகேள் நிணம் போலே நீரில் காணும்
நண்ணியதில் பாடையும் காய்ச்சினாலும்
நாறுமே நிணவாடை நவிலப் போகா
வண்ணமாம் தேகமது உலர்ந்து போகும்
வளமாக மேனி குன்றும் உடல் தள்ளாடும்
தண்மையாய் வேளைக்கு முந்நாழி நீரு
தெளிவாக இறங்கும் என்று சாற்றலாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 156)

Urine like as lymph and odour of the lymph present when boiling. Emaciation, weight loss and weakness of the body are the other symptoms. Three *naazhi* (1680 g) urine passes at a time.

12. *Oothaka varnan*

‘போகுமே உதக வர்ணன் தோன்றும் ஆனால்
பொருந்தும் நீர் தெளிந்த சலம் ஆக காணும்
பாகுறவே ஆயாசம் மயக்கம் மூர்ச்சை
பண்பாகவே உடலும் அயர்ந்து போகும்
வேகமுற வேளைக்கு குறுணி நீரு
விடும் எனவே நன்றாக சொன்னார் தாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 158)

Clear urine. Fatigue, faintness, unconsciousness and tiredness present. One *kuruni* (5.376 L) urine passes at a time.

13. *Malsiya varni*

‘தானமுள்ள மல்சிய வர்ணி குணத்தைச் சொல்வேன்
தப்பாமல் பண்டிதர்கள் அறிய வேண்டி
ஈனமுற நிணம் உருகி நீரிறங்கும்
இதை காய்ச்சினால் மீனின் வாடை உண்டாம்
ஊனமற தேகம் எல்லாம் உலர்ந்து போகும்
உறவான தாதயரும் அஸ்தி காயும்
மோனமுற வேளைக்கு மூன்று நாழி
மோதுமென பெரியோர்கள் சொன்னவாறே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 161)

Emaciation, the fat melts and pass with urine (*ninam*). Fish flesh odour when boiling the urine. Dryness of the body and bones. Three *naazhi* (1680 g) urine passes at a time.

14. *Thoola varnan*

‘திண்ணமுடன் தூல வர்ணன் தானும்
திறமாக இளநீர் போல் சலமிறங்கும்
வண்ணமுற இளநீரின் வாசமுண்டாம்
வளமாக தேகமது மெலிந்து காணும்
நிண்ணயமாய் உடல் நோகும் மனக்கலக்கம்
நித்தமுமே ஆயாசம் தளர்ச்சியுண்டாம்
எண்ணமுறவே வேளைக்கு நாழி சாயும்
ஏற்ற குணம் இதுவென இசைக்கலாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 163)

Colour and odour of the urine resemble as tender coconut. Emaciation, ache and pain in the body, mind disturbance, fatigue presents daily, weakness and 1 *naazhi* (560 g) urine passes at a time.

15. *Suraari varnan*

‘புகலுவேன் சுராரி வர்ணன் குணத்தை யானும்
பொருந்து கள்ளின் வர்ணமதாய் வெளுத்த நீரு
இகலுவேன் பதையோடு ஏகும் இன்னும்
இதை காய்ச்சினால் கள்ளின் வாடை உண்டாம்
நுவலும் இடுப்போடு பொருத்து குறுக்கு போகும்
நேரிழையாள் தனை வெறுக்கும் தாது குன்றும்
அகலும் ஒரு வேளைக்கு நாழி நீர் போம்
அறிகுவாய் இதின் குணம் என்று இயம்புவாயே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 165)

Colour of the urine seems as toddy and toddy odour present when boiling the urine. Pain in the hip, weakness and 1 *naazhi* (560 g) urine passes at a time.

16. *Asthi varnan*

‘போகுமே அஸ்தி வர்ணன் குணம் ஏதென்றால்
பொருந்து சலம் சுக்கிலத்தின் வர்ணமாகும்
வாகுபெற தாளியாது கலக்கினாப்போல்
வளமாகவே சிறுக நூல் போல் பாயும்
ஆகுமே காய்ச்சில் கட்டியாகி
அது புகைந்து துற்கெந்தவாடை உண்டாம்
பாகமுறவே பொதிகை முனிவர் சொன்ன
பண்பான அஸ்தி வர்ணன் பாங்கிதாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani, v*erse 167)

Colour of urine like as semen and passes like as thread. When boil, the consistency of urine changes into solid and produce bad odour.

17. *Kashaya piraban*

‘வாறான கஷாய பிறபன் செய்கை
வழுத்துகிறேன் நீர் சிக்கி காடி வெள்ளம்
வீறாகவே இறங்கும் காடி தானும்
விளங்க அதை சுண்டினால் சுண்ணாம்பு ண்டாம்
கூறாகவே உடம்பு கெந்தம் வீசும்
குணம் கெட்டு நீரதிகம் ஆகப் போகும்
நீறாகவே உலரும் உடம்பு தானும்
நிகழ்த்துவேன் கஷாய பிறபன் என்றே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 169)

White colour (*kaadi*) urine and lime stone like sedimentation appears when boil. Sulphur smell presents in the body. Emaciation and excessive urination present.

18. *Neela varnan*

‘ஓதினார் நீல வர்ணன் அது தன் செய்கை
உறு தேனின் நிறமாக நீரிறங்கும்
மோதும் அந்த தேனினுட மணம்தான் வீசும்
முன்னுமதை தெளிய வைத்தால் மெழுகு போலே
சாதுவுடனே உறையும் எறும்பரிக்கும்
சறுகாமல் தேகம் தேன் மணம் தான் வீசும்
போதமுற நாளுக்கு பத்து நாழி
பொருந்து சலம் இறங்கும் என பேசுவாரே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 171)

Colour and odour of the urine like as honey. Wax like sedimentation appears when keep the urine into a utensil. Swarming of ants occur. Honey smell is present in the body. Ten *naazhi* (5600 g) urine passes at a time.

19. *Lavanap piravaahini*

‘தானமுறவே லவணப் பிறவாகினியின்
தன்மைதனை சொல்லுகிறேன் சலத்திலே தான்
ஏனமுற சுண்ணாம்பு காரம் போலாம்
இதமாக காய்ச்சினால் காரம் காணும்
ஊனமற எரிவுடனே கடுப்பு சூடு
உறவாகும் அஸ்தியில் சூடுண்டாகும்
மோனமுற வேளைக்கு படி நால் நீரு
மோதுமெனவே தெளிவாய் மொழியலாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 173)

Alkaline medium of urine (lime stone pH) is avilable. Burning sensation and pricking pain occur and feeling of heat in bone is found. Four *padi* (5.2 L) urine passes at a time.

20. *Sukkila varnan*

‘நீராகும் சுக்கில வர்ணன் குணம் ஏதென்றால்
நீர் இறைச்சி கழுவினதின் சலம் போல் காணும்
சீராக காய்ச்சினால் மாமிசம் போல் நாறும்
சிறப்பாக காணும் இதில் சூடும் உண்டாம்
பேராக நீர்த்தாரை முறுக்கம் ஏறும்
பிலக்கேடாய் தாதயரும் உடல் தள்ளாடும்
வேராக வேளைக்கு படிதான் மூன்று
விளங்கவே சலம் அதுவும் போகும் வாறே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 175)

Flesh wash water appearance of urine as well as fleshy smell is present when boiling the urine. Weakness, unsteadiness available and 3 *padi* (3.9 L) urine passes at a time.

Classification II

Ramachandran, (2000) documents 24 types of *neerizhivu* such as,

1. *Vatha neerizhivu* – 3
2. *Vatha piththa neerizhivu* – 4
3. *Piththa neerizhivu* – 3
4. *Piththa vatha neerizhivu* – 2
5. *Sileththuma neerizhivu* – 4
6. *Sileththuma piththa neerizhivu* – 3
7. *Sileththuma vatha neerizhivu* – 5

The table 1 has shown the types and character of *neerizhivu* documented by Ramachandran (2000).

Table. 3.1. Characters of the types of *neerizhivu* according to Ramachandran (2000)

Types of *neerizhivu*		**Characters**	
		Smell	**Taste**
Vatha neerizhivu - 3	Type 1	Mango flower	Sour
	Type 2	Saffron	Bitter
	Type 3	*Kaadi*	Sour
Vatha piththa neerizhivu - 4	Type 1	Turmeric	Bitter and sour
	Type 2	Oleander	Five types of taste
	Type 3	Milk	Butter
	Type 4	Lymph	Bitter taste like sweet flag
Piththa neerizhivu - 3	Type 1	Syrup	Bitter
	Type 2	Salt	Salt
	Type 3	Jasmine	Salty
Piththa vatha neerizhivu - 2	Type 1	Cow's urine	Astringent
	Type 2	Sandal	Black pepper
Sileththuma neerizhivu - 4	Type 1	Screw spine	Sweet
	Type 2	Cow dung	Sweet
	Type 3	Lime	Sweet
	Type 4	Blood	Sweet
Sileththuma piththa neerizhivu - 3	Type 1	Bad odour	Lime stone
	Type 2	Champak	Jamun fruit
	Type 3	-	-
Sileththuma vatha neerizhivu	All 5 types	Bad odour	sour

Classification III

The text book the *Yuki vaiththiya kaviyam* (2014) describes 20 types of *neerizhivu*.

‘உந்தியில்வாதபித்த சேத்துமமூன்றுந்தானும்
வந்தியாயிழையும்பத்தி மகிழ்ந்திடவொன்றுக்கொன்று
வந்தமில்லாதநாலு மடுந்திடும் பித்தமாறும்
தந்தசேத்துமமேபத்து தவறாமலாதியாமே’

(*Yuki vaiththiya kaviyam*, verse 792)

The above verse describes 20 types of *neerizhivu* based on *Vatham*, *Piththam* and *Kabham*. Further the book documents four type of *Vatha neerizhivu*, six *Piththa* and ten in *Kabha neerizhivu*.

The following verse describes the types and characters of *vatha neeerizhivu*

‘வாதத்தினால் வந்தநாலுக்கும் வழுசுதும்பேருங்குணங்கேளாய்
நீதிவசளையுத்தமனும் நீளும்போசனமற்றிடினும்
போதப்பேசன்னனெனய்பொதிந்து பொன்னே வெண்ணை விளக்கெறியும்
மாதேமத்திடன் கோமயமும் வருந்து நாறுமன்னியதே’

(*Yuki vaiththiya kaviyam*, verse 807)

‘வசளைப்பிரமியமொன்றுக்கு மகிழுமிறைச்சி கழுநீர்
அசையுநெய்போலேமிதக்கு மாகும்வசளைப் பிரமேகம்
நிசமாயுத்தமேனெனும் வகையே நீளும்பால்போல் நாடுமென்று
விசையுங்கறுப்புத்தேங்காயி லிருக்குமுத்தமன் குணமன்றே’

(*Yuki vaiththiya kaviyam*, verse 808)

The verse describes the types of the *vatha neerizhivu* as *vasalai uththaman*, *vasalai bramiyam*, *vasalai bramegam* and *uththaman*. The literature describes the characters of *vasali uththaman* as loss of appetite and the urine like as *komayam*. In *vasalai bramiyam*, the urine appears as flesh wash water and the urine burn when contact with fire. Urine appears as oil floating in water and milk in *vasalai bramegam* and *uththaman* respectively.

The following verse describes the character of *piththa neeerizhivu* in.

‘உதிரமுங்கரிப்புமுண்டா யுவருடன்புளிப்புஞ்சால
சதிரதுதானழிந்து தலையதுசுழற்றுஞ்சால
முதிரவேகிறுகிறுத்து மூர்ச்சிக்கும் பித்தமாறும்
பேதிரகன்மனதுபோல போவதுவருவதாமே’

(*Yuki vaiththiya kaviyam*, verse 796)

The above verse describes the common characters of the *Piththa neeerizhivu* as the patient prefer salt and sour taste, loss of memory, giddiness and loss of consciousness. Even though the types of *Piththa neeerizhivu* is not mentioned.

In addition the following verse reveals some characters of *piththa neerizhivu*.

‘பித்தத்தினாலுவருமாறுக்கும் பெருகுமானைமதம்போலு
முத்தக்கற்றாழைநாறுவது முதிர்ந்ததவழாப்போல்நாறுவதும்
முற்றநீர்பட்டவிடமெல்லா முனிந்தேயெரிப்பு நாறுவதும்
மற்றபூவேயெரிக்கும் வாகக்கடுத்துகழியுமன்றே’

(*Yuki vaiththiya kaviyam,* verse 809)

The odour of the urine in similar to that of aloe or wild spider flower or burning smoke and the patient suffers from dysuria.

The following verse describes the types and characters of *kabha neeerizhivu*

‘சேத்துமத்தால் தோன்றும்பத்துக்குஞ் செப்பக்கேளுமிதன்பேரை
யீத்தேயுமன்தெசபனன்பன் நீபனந்தன்நற்றீயா
நீத்தசுக்கில்லவனுடநீளுஞ் சதாசிவனென்போது
மாத்தும் விஷ்ணுதானுமிக மன்னும்பத்துவகையாமே’

(*Yuki vaiththiya kaviyam*, verse 810)

Ten types of *kabha neerizhivu* documented in *Yuki vaiththiya kaviyam*, eventhough nine types described as *uththaman, thesaban, pananthan, sukkilan, sathasivan, vishnu, alavanan, mannan* and *manthiri.*

‘உத்தமணிநீர்போலிருக்க முகந்தசதாசிவன்கந்தம் போல்
வைத்தவுப்பிசமிகவுண்டாம் மன்னுமிவனுநுரை போலாம்
மெத்தவிஷ்ணுகரைத்தமாப்போல் மின்னும்பழுப்புந்தித்திப்பாம்
மத்திரியென்போன்பூவெரிக்கு மானநீரும்பிரம்பெரிக்கும்’

(*Yuki vaiththiya kaviyam*, verse 811)

‘சுக்கிலங்கருப்பன்பால்போல் சுதித்தரசமுமுண்டாகும்
மிக்கலவணன்குதிரைநீர்போல் மிகுந்ததயிர்நிறமாயீமொய்க்கும்
தக்கசேதமம்பத்துக்கும் தானேகுணமொன்றுந்தப்பாது
ஒக்கமுனிவர்மானிடர்க்கு வுரைத்தாருண்மைப்படியன்றே’

(*Yuki vaiththiya kaviyam*, verse 812)

The verses 811 and 812 describes the characters of urine in *Kabha neerizhivu* and the table 2 has shown the characters of *Kabha neerizhivu,*

Table. 3.2. Character of *kabha neerizhivu* according to *Yuki vaiththiya kaviyam*

Type of ***Kabha neerizhivu***	**Characters of urine**
Uththaman	Like water
Thesaban	-
Pananthan	-
Sukkilan	Smell like juice of sugar cane
Sathasivan	Smell like sulphur
Vishnu	Urine shine as flour batter in water
Alavanan	Like horse urine or curd
Mannan	Excessive frothy in urine, sweat in taste,
Manthiri	When contact with fire the urine will burn

3.4 Causes of *neerizhivu*

Tri humours such as *Vatham*, *Piththam* and *Kabham* are the basic principal of Siddha system of medicine, which governs the psycho-biological aspect of the body (Natarajan, 2009). Further the author (Natarajan, 2009) documents that increases or reduces of the tri humours causes disease. In addition, *Agasthiyar vaiththiya vallathi*-600 describes (in the following verse) that increase of *Vatham* causes *neerizhivu*.

‘……மூண்டிடுமே வாதமீறில் நீரிழிவே…..’

(*Agasthiyar vaiththiya vallathi*-600,verse 5)

The text book *Meha noi, Soothaga nool mattrum arivaiyar sinthamani* (2008) documents the causes, pathogenesis and the types of *neerizhivu* in the following verses.

‘கூறான நீரிழிவும் இருபதாகும்
கொண்டெழுந்த வரலாறு கூறக்கேளு
வாறான பால் நெய்யும் இறைச்சி கள்ளு
வளமான மீன் வேகாப்பண்டம் மாவு
ஊறாகவே அதிகம் தணுத்த வஸ்த்து
உறவாகவே அதிகம் புசித்தாலும்
நீறாக பெண் போகம் விரும்பிச் செய்து
மிக தேகம் தடித்து அனலின் காரணத்தால்’

‘காரணமாய் நித்திரை இல்லாததாலும்
கதிப்பான அக்கினியின் மந்தத்தாலும்
சீரணியா கல் உமியும் புசிக்கலாலும்
சிறந்தடங்கா சஞ்சலத்தின் ஏதுவாலும்
பூரணமாய் மூலமதில் அனலு பற்றி
பொருந்தும் அத்தி மூளை வெந்து பொங்கி
மாரணமாய் மச்சையொடு கொழுப்பு மற்றும்
மங்கியே நரம்பெல்லாம் பலமும் கெட்டு’

‘கெட்ட உடல் தனில் உள்ள நீர்களெல்லாம்
கெறுவுடனே விஷ நரம்பு தன்னில் புக்கி
மட்டுடனே அங்கமதின் கொழுப்பு எல்லாம்
மாறுமவை நீராக வடிந்து பாயும்
திட்டமுடன் கண் குழியும் கன்னம் ஒட்டும்
தேகமது பலம் குறைந்து ஆடிப் போகும்
சொட்டு விழும் நீரிழிவின் செய்கை தன்னை
செப்புகிறேன் விபரமதை தேர்ந்து கேளே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 108-110)

The above verses describe, excessive intake of milk, meat, toddy, fish, partly cooked food and flour, increase sexual activities, loss of sleep, indigestion, taking indigestive foods and mind disturbance are the causes for *neeizhivu*. Further, the above causes promote the *Piththam* and the *Piththam* affect on the bone especially bone marrow

and fat in the body. Thereafter it affects the nervous system. Finally it causes emaciation and weakness of the body and the fat excretes with the urine.

The *Yuki vaiththiya kaviyam* (2014) also states the causes for *neerizhivu* in the following verses (verse 785, 786 and 789).

‘கோதையர்கலவிபேராங் கொழுத்தமீனிறைச்சியோடும்
போதவேபாலுநெய்யும் பொருந்தநீர்மிளகுசாறு
ஆசையினாலேயுண்டு அன்றிராவுரங்கானாகில்
சோகையும்பித்தபாண்டு சொல்லுநீரிழிவுமாமே’

(*Yuki vaiththiya kaviyam,* verse 785)

‘மண்டலந்தன்னிலுள்ள மனிதரிற்பெண்ணுள்ளோர்க்கும்
கொண்டதோர்பிரமேகந்தான் கொள்ளுமுன்னெடுத்த நோய்கள்
கண்டுடன்கை கால் தானுங் கழண்டிடுமண்ணேகாந்தி
உண்டநீர்சுவறிக்கட்டி யுடைந்துநீரிழிவுவாமே’

(*Yuki vaiththiya kaviyam*, verse 786)

‘கட்டளைமிகுந்திட்டாலுங் காலங்கள்தப்பினாலும்
இட்டமாம்பாலுந்நெய்யும் யிரதமும்புளிப்புமிஞ்சில்
வட்டமாமுலையார்தங்கள் மயக்கத்தின்கலவியாலும்
நெட்டிலைக்கோரை போலே நீரிழிவாகுந்தானே’

(*Yuki vaiththiya kaviyam,* verse 789)

‘பரிந்தேநெய்யுடன்பாலுடனே பருத்தமீனுறைச்சியது
இருந்தேயுண்டுசுகமதனை யிடைதான்விடாமலனுபவித்து
வருந்தாதுடலும்தான்வத்தி மன்னியுடைந்துநீரிழிவாம்
திருந்தபோகமனுதினமுங் களர்ந்தகொடுமையாற்செய்து’

(*Yuki vaiththiya kaviyam,* verse 790)

‘கேளாய்போகமனுதினமுங் கிளர்ந்தகொடுமையாற்செய்து
நாளுஞ்சொல்லிக்குடிகெடுத்து நற்பெண்டீரும்பதிவிரதை
வாளார்கன்னிகற்பழித்து வரம்புகடந்துமாறாகி
மாளாமாளும்வியாதியினால் வலியநோய்கள்வந்திடுமே’

(*Yuki vaiththiya kaviyam,* verse 791)

The verses describe having excessive sexual activities, having excessive workload, avoidance of sleep after having large fish, meat, milk, ghee and decoction of pepper, delay intake of food, excessive intake of milk, ghee, meat, sour taste, the diseases present before affected by *bramegam* and rupture of cyst causes *neerizhivu*.

3.5 Complication of *neerizhivu*

Ten types of complications describes in *Meha noi, Soothaga nool mattrum arivaiyar sinthamani* (2008) as,

‘காணுமிந்த நீரிழிவு தான் உற்றோர்க்கு
கதிக்கின்ற பத்து வித அவஸ்தை சொல்வேன்
பூணுகின்ற முதல் அவஸ்தை உடம்பு தானும்
பொருத்தமுற கனமாகும் பருத்து காணும்
நண்ணு சிறுநீர் தான் தணுக்கும் நீர் கடுக்கும்
நலமான இரண்டாவது அவஸ்தை சொல்லக் கேளு
வேணு மூத்திரம் தனில் சுக்கிலம் காணும்
வேறுமுகம் அழுக்கேறி மேனி குன்றும்’

‘குன்றியே மூன்றவஸ்தை வறளும் நாக்கு
குணமான வாய்வுறும் நாலவஸ்தை
துன்றியே தாகமுறும் சன்னி பாதம்
துடருமே ஐந்தாவது அவஸ்தை கேளு
வென்றி நீர் அதிகம் போம் தாது குன்றும்
வீறான ஆறாவது அவஸ்தை என்னில்
மன்றினிலே பிரதாபம் மூர்ச்சை வேவு
மருவும் இதன் முறமையென செப்பலாமே’

‘செப்பியதோர் ஏழாவது அவஸ்தை கேளு
சிறப்பான அரோசியமும் வீக்கம் உண்டாம்
ஒப்பியதோர் எட்டாவது அவஸ்தையாகில்
உறும் கிரந்தி பிளவை உண்டாம் உறவதாக
தப்பியதோர் ஒன்பதுக்கு குறையும் அன்னம்
தான் கிருமி மூத்திரத்தில் மிகுதியாகும்’
மெய்ப்பான தச அவஸ்தை கூடியம் உண்டாகி
மேலான சடம் அழியும் உண்மையாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 121-123)

In the first stage, the body weight increases, feeling of heaviness and dysuria occurs. In the second stage, the sperm passes in the urine, changes occur in the appearance of the body and the body weight decreases. Dryness of mouth and gas formation occurs in the third and fourth stages respectively. Delirium (*sanni*) is present in the fifth stage. Excessive urination, emaciation and loss of consciousness arise in the sixth stage. At the stage of seven loss of taste and anasarca appear. *Kiranthi* and *pilavai* appear at the stage of eight. Loss of appetite and organism appear at the stage of nine. Finally in the tenth stage *shayam* (tuberculosis) ensues and the person dies.

3.6 Prognosis of *neerizhivu*

According to the *Meha noi, Soothaga nool mattrum arivaiyar sinthamani* (2008) the following verse documents that the six types of *Piththa* and ten types of *Kabha neerizhivu* are curable, whereas four types of *Vatha neerilizhivu* are incurable.

‘கேளுமினி வாதமதில் சேர்ந்து நாலும்
கேடியான பித்தத்தில் ஆறுமாகும்
வாளுமினி சேர்ப்பத்தோடு எழுந்த பத்தும்
வளமாகவே அவைகள் இருபதாச்சே
நாளுமினி வாதத்தில் நாலும் அசாத்தியம்
நலமாக பித்தத்தில் எழுந்த ஆறும்
சூளவே வருத்தமதாம் சேர்ப்பத்தாலே
சூழ்ந்த பத்தும் சாத்தியம் என்றுரைக்கலாமே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 111)

3.7 Dietary regimen for *neerizhivu*

The *Meha noi, Soothaga nool mattrum arivaiyar sinthamani* elucidates the foods which can intake and avoid in the condition of *neerizhivu*. The following stanzas explain the dietary regimens for *neerzhivu.*

‘கொல்லாமல் நீரிழிவு உள்ள பேர்க்கு
கூறாக உபயோக பதார்த்தம் சொல்வேன்
நல்லான மேதி வெண்ணெய் மேதி மோரு
நவிலும் பொன்னாங்காணி சிறுகீரை தானும்
வல்லான முசிட்டை இலை அவரை பிஞ்சு
வளர் புடலங்காயுடனே முருங்கைப் பிஞ்சு பத்திரம்
அல்லாத விளாங்கனியுடன் பேயன் பழமும்
அத்தியுடன் பிஞ்சு சிறுபயறு தானே’

‘தானமுள்ள பழம் சோறு பாகல் பீர்க்கு
கறி வேப்பிலையுடனே மல்லிக் கீரை
ஏனமுள்ள நெல்பொரியும் முசுக்கை பத்திரம்
ஏற்ற எள்ளு அதினெண்ணெய் வரகு தானும்
ஊமறவே உளுந்து உலுவாய் சீரம்
உறவான கொத்தமல்லி கோதம்போடே
ஆன ஊர் குருவியோடு அடைக்கலானும்
அதினோடே காடை வெள்ளாட்டின் இறைச்சி உண்ணு’

‘உண்ணுவாய் சவ்வரிசி துவரை சாமை
உற்ற கலை மானிறைச்சி உடும்பு பூனை
நண்ணு மரநாய் கீரி குயிலும்
நலமான தவிட்டுப் புறா வெண்புறாவும்
சண்ணுமே கூவை நீர் அமிர்வது மாவும்
சலியாமல் கொல்லாமாவின் அண்டி உண்ணு
வண்ணமுறும் வாதுமையின் பருப்பு நெத்தலி
திறமான கருவாடு ஆகும் சொல்லே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani,* verse 129-131)

The stanzas reveal, butter, butter milk, sessile joy weed, green amaranth, common night glory, tender beans, snake gourd, tender drum stick, wood apple, tender Indian fig fruit, green gram, bitter gourd, king of gourd, curry leaves, coriander leaves, cold cooked rice, madras pea pumpkin, gingelly oil, kodo millet, green gram, fenugreek, cumin, coriander, kind of sparrow, quail bird, goat white ovis, sago, meat of art deer, iguana, cat, switch dog, Asian palm civet, mungos, cuckoo, red turtle dove, white dove, arrowroot flour, flour of lead wood tree seeds, white bait and dry fish are good to intake for the condition of *neerizhivu*.

The below verses document the food which should be avoided in the condition of *neerizhivu*.

‘சொல்லுவேன் ஆகாத வகை ஏதென்றாக்கால்
காயமொடு இளநீரு சுக்கு மச்சம்
வெல்லுவேன் கோழியொடு கடுகு கள்ளு
விதமான சாராயம் பசுவின் நெய்யும்
நல்லவே ஆவின்பால் தயிரு பலாக்கனி
விளங்கும் உள்ளி ரண்டு கரும்பின் நீரு
துல்லிபமாய் மாங்கனியும் இலவின் பிஞ்சும்
துரட புளி பச்சை வெள்ளம் ஆகாதென்றே’

‘ஆகாது ஈந்தி ரண்டும் திராட்சம்
அழகான சீனியொடு தேன் கற்கண்டு
பாகான வெல்லம் வகை ஆட்டின் பால்
பகர் தேங்காய் பெரும் முதிர வர்க்கம்
வாகான பன்றியொடு பலகாரங்கள்
வளரு புகை இலையும் பானகம் தானும்
ஏகாது இவை எல்லாம் கொள்ளும் பேர்க்கு
இதக்கேடாய் வர்த்திக்கும் ரோகமென்றே’

(*Meha noi, Soothaga nool mattrum arivaiyar sinthamani*, verse 132-133)

Asafoetida, tender coconut, dry ginger, meat, chicken, mustard, toddy, variety of alcohol, ghee, cow’s milk, curd, jack fruit, onion, garlic, juice of sugar cane, mango, tamarind and sugar should avoided.

In addition the verse document the foods which cause neerizhivu are grapes, brown sugar, honey, sugar candy, goat’s milk, coconut, pork, sweetmeat, smoked leaves and drinks.

3.8 Diagnosis of Neerizhivu madhumeham according to the Siddha system

3.8.1 *Envagaithervu*

The Siddha system has unique assessment methods as *envagaithervu* (*naadi, sparism, naa, niram, mozhi, vizhi, malam and siruneer*) to diagnosis the diseases (Agasthiyar vaiththiya sillarai kovai, 2010; Natarajan, 2009; Shanmugavelu, 1967). *Agasthiyar vaiththiya sillarai kovai* (2010) explains *envagaithervu* as,

‘தரணியுள்ள வியாதிதனை யஷ்டாங்கத்தால்
தானறிய வேண்டுவது யேதேதென்னில்
திரணியதோர் நாடிகண்கள் சத்தத்தோடு
தேகத்தி னதுபரிசம் வானம்நாக்கு
இரணமல மூத்திரமா மிவைகளெட்டும்
இதம்படவே தான்பார்த்துக் குறிப்புக்கண்டு
பரனருளாற் பெரியோர்கள் பாதம்போற்றிப்
பண்புதவறாமற் பண்டிதஞ் செய்வீரே’

(*Agasthiyar vaiththiya sillarai kovai*, 2010)

The above stanza explains disease can be diagnosed with *envagaithervu* - *naadi, sparism, naa, niram, mozhi, vizhi, malam and siruneer*.

3.8.2 *Neikuri*

Neikuri is one of the methods of urine examination, based on distribution of oil drop in urine. It is a remarkable diagnostic and prognostic parameter and well explained by sage Theriyar and Agasthiyar (Kannusamy pillai, 1931; Shanmugavelu, 1967). In addition the *neikuri* forecast the curable and incurable disease (Kannusamy pillai, 1931; Shanmugavelu, 1967). The sparding and the shape of the *neikuri* varied according to the disease condition.

Literature documents the procedures to investigate the *neerkuri* and *neikuri*. *Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum* explains the procedures to conduct the *neerkuri*.

‘அருந்தும் ஆறிரதமுமவிரோதமதா
அ.ஃகல் அலர் தலகாலவூண்டாவிர்ந்தழற்
குற்ற அளவருந்தியுறங்கிவைகறை
ஆடிக்கலசத் தாவியேகாதுபெய்
ஒரு முகூர்த்தக் கலைக்குட்படுநீரி
நிறக்குறி நெய்க்குறிநிருமித்தல் கடனே’

‘நிறக்குறிக் குரைத்த நிருமாணநீரிற்
சிறக்க வெண்ணெய்யோர் சிறுதுளிநடுவிடுத்
தென்றுறத்திறந் தொலியே காதமைத்ததி
னின்றதிவலையோ நெறிவிழியறிவுஞ்
சென்றது புகலுஞ் செய்தியையுணரே’

(*Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum*)

The above literature explains that, during the early morning urine need to collect into a glass utensil, on that condition that the person has ingested six taste of food on the previous day night and good sleep. Apply a drop of oil on the surface of the urine, within one and a half an hour after the collection of the urine. Even though, Sage *Theraiyar* explains,

‘அருப்பமுற்றார்க் கவ்விதிவிலக்கே’

(Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum)

that the rules not need be followed when examining the *neikuri* to a patient (Shanmugavelu, 1967).

Several literature documents different shapes of the *neikuri* in the condition of *neerizhivu*. The *Yuki vaiththiya kaviyam* (2014) explains that the *neerizhivu* cannot be curable when the *neikuri* shape in round and wreathe. In contrast *Sikichcha ratnathepam* indicates the *neerizhivu* can be curable when the *neikuri* in the shape of parts of the body, face, fish and temple. In addition the literature states that it takes a prolong time to cure the *neerilizhivu* if the *neikuri* is in the shape of wheel. The following verse indicates the above facts.

‘கையினிலெண்ணைவாங்கி கழிந்தநீர்தன்னிற்குத்த
செய்ததுவட்டமாகுஞ் சேருந்தோரணம்போல்தானும்
ஜயமுமில்லைகண்டாய் சாத்தியமல்லவென்று
துய்யநன்முனிவர்தானுஞ் சொல்லியகுறிப்பிதாமே’

(*Yuki vaiththiya kaviyam*, verse 793)

‘மன்னிய வவய வங்கள் மனிதர்போல் மச்சங் கோயி….
…. ரோகமே நிற்க மாட்டா துரைக்குஞ்சா த்தியக் குறிப்பே’

(*Sikichcha ratnathepam*, verse 47- 52)

‘சுற்றுமச் சக்கரம்போல் தோற்றிடு முருவங் கண்டால்
சத்திய மாகச் சொன்னேன் தாமசாத் தியந்தா னாமே’

(*Sikichcha ratnathepam*, verse 53)

The following verse documents the diseases can be curable if the *neikuri* spreads slow and round in shape.

‘விருத்தப்படி வமுந் தரித்துப்பரவலுந்
தெரித்த நெய்க்குறிக் கினிவருத்த மென்னுலகீ
ராங்கப் பரவல் போனீங்கு மெப்பிணியுமே’

(Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum)

3.8.3 *Neerkuri*

Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum explains the general characters to test *neerkuri* as,

‘வந்தநீர்க்கரியிடை மணநுரையெஞ்சலென்
றைந்திய லுளவையறை குதுமுறை’

(*Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum*)

Five general characters as colour, odour, froth, sediment and volume of the urine are documented in the above verse to test *neerkuri.*

3.8.3.1 Colour variation of urine

Five types of the colour of the urine are documeneds in literature as, yellow, red, green, black and white (Shanmugavelu, 1967; Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum, 2015). The following verse describes the above colours.

‘பீதம் செம்மைபைங் கருமை வெண்மையென்
றோதைங்கொழுயை யொத்துகு நீரே’
(*Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum*)

According to the following verse documents that, the five colours are further subdivided; the colours yellow, red, green, black and white of the urine further subdivided into six, four, five, four and two based on the appearance respectively.

‘அரிசனத்தாறும் அருணத்து நான்கும்
அரிதத்தைந்தும் அஞ்சனத்தொரு நான்கும்
வெண்மையுள் இரண்டுமாய் விள்ளுஞ் சுருதியே’
(*Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum)*

Characters of *neerkuri* and *neikuri* in *Vatha*, *Piththa* and *Kabha neerizhivu* according to *Yuki vaiththiya kaviyam*.

1. *Neerkuri* and *neikuri* for *Vatha neerizhivu*

‘மூளையுநிணமும்போலு மூந்துஞ்ச்சுக்குலமேபோலும்
நீளியநரம்புபோலு நீரிலேதோன்றுமாகில்
ஆளெறிவேலுங்கோலு மணங்குடனன்னம்வீர
வாளையும்வேண்டாங்கண்ணாய் வாதமுநான்கதாமே’
(*Yuki vaiththiya kaviyam*, verse 795)

The above verse explains if the neikuri appears as the structure of brain, lymph, sperm, nerve, spear, swan and sword in four types of *Vatha neerizhivu* is not curable.

2. *Neerkuri* and *neikuri* for *Piththa neerizhivu*

‘நீலனீர்மஞ்சணித்து நீத்துநீர்விளித்திருக்குஞ்
சாலவேசாம்பல்தன்னை கழுகழுவென்னீர்போலாம்
காலமேயிறைச்சிதன்னை கழுவினநீர்போலாகும்
மால்விழியனையிர்பித்த மானநீர்க்குணமிதே’

(*Yuki vaiththiya kaviyam*, verse 797)

The verse indicating that, colour of the urine of *piththa neerizhivu* designates as yellow, grey and fleah wash water.

3. *Neerkuri* and *neikuri* for *Kabha neerizhivu*

‘அரும்புனல்கூரைநீரு மடிக்கரும்பதனிற்சாறும்
விரும்பியதயிர்பால்நீரு விரகுடன்சேத்தபாகும்
திருத்தியதேனிற்பாகும் சிதைந்தயிவ்வாறுபோலாம்
குரும்பைசேர்முலைநல்லாளே கூறுஞ்சேத்துமத்தினரே’

(*Yuki vaiththiya kaviyam*, verse 798)

The above verse metions the *neerkuri* of the *kabha neerizhivu* look like the colour of water flow from the old roof, sweet drink extracted from palmyra, curd, milk, water, a thick consistence of boiled jaggery and honey.

3.8.3.2 Froth in urine

The verse,

‘பந்தமெய்ப் பசையிளக்கப்படும் பருவத்
துந்தர்பூத மாயனில மூத்திரத்திற்
சம்பந்தப் படுந்ததி நுரைப்புனலே’

(Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum)

describes that when the *Kabham* decreases in the body , the *vayu* will appear in the urine and form froth. In addition the *Sikichcha*

ratnathepam explains in the following verse that, the froth will appear in the urine if the patient having *Kabha* disorders.

‘நிலைக்குநற் கபமே யாகில் நீர்நுரை போன்றிருக்கும்
இலகுமா மூத்தி ரத்தி லெண்ணெயெ விட்டுப் பார்க்கில்……’

(*Sikichcha ratnathepam*, verse 47)

Further *Therar arulichcheitha siruneerkuri sothanai* explains, the froth will appear in the *kabhavatha* disorders.

3.8.3.3 Odour, sediment and volume of urine

Literature explains different types of odour, sedimentations and weight of the urine explains in various diseases conditions. (Shanmugavelu, 1967; Theraiyar Neerkkuri vaiththiyam Neerkkurinool- neikuri nool moolamum uraiyum, 2015)

3.8.4 *Naadi*

Naadi is a diagnostic way to assess health status of an individual (Ivy and Malini, 2010) and a remarkable diagnostic parameter, included in *envagaithervu* and well explained by *Siddhars* (Kalaththur kanthasami, 2012).

The following literature documents the procedures to read *naadi*.

‘கரிமுக னடியை வாழ்த்திக்
கைதனில் நாடிபார்க்கில்
பெருவிரல் லங்குலத்தின்
பிடித்திட னடுவே தொட்டா
லொருவிர லோடில் வாத
முயர்நடு விரலிற் பித்தந்
திருவிரல் மூன்றி லோடில்
சிலேத்தும நாடியாமே’

(Agasthiyar vaiththiya sillarai kovai, verse 46)

‘குறியாம் வலக்கரங் குவிந்த பெருவிரல்
மறிவாயதன்கீழ் வைத்திடுமூவிரல்
பிறிவாய் மேலேறிப் பிலத்தது வாதமாம்
அறிவாய்நடுவிரல் அமர்ந்தது பித்தமே’

(*Thirumoolar vaithiyam karukkadai* – 600, verse 23)

‘பித்தின்கீழே பிரண்டது ஐயமாம்
உற்றுற்றுப்பார்க்க ஓர்நரம்போடும்
பத்தித்தமூவரும் பாய்கின்றவேகத்தால்
மத்தித்தநாளம் போல் வழங்கும் நரம்பித்தே’

(*Thirumoolar vaithiyam karukkadai* – 600 , verse 24)

‘மூன்றுவிரலாம் பெருவிரற்கீழ் முனிவர்தானூன்றி முன்பார்க்கத்
தோன்றும்வாதம் நடுப்பித்தந் துலையாகச் சேத்தும திடத்தென்ப
கான்று மிகவும கரமாயக் கடுகிநடக்கு மவைகண்டால்
ஊன்றும் விரலை விட்டுவிட்டு உபசாரமாய்’

(Venkatrajan, verse 66)

‘ஓது முதல்விரல் வாதத்தாலே
ஒடுக்கும் நோயென்று அறிந்துகொள்ளு
பேத மில்லாமல் மறுவிரலும்
பித்தத்தா லென்று பேசிவிடு
சேத மில்லாமல் மூவிரலாற்
சிலேற்பனத் துள்ள நோய்களென்றும்
வீதப் படியின்ன தாலேவந்த
வியாதி யிதுவென் றறிந்துசொல்லே’

(*Yakopu vaiththiyam* 300, verse 68)

The above verses state that the procedures to examine *naadi* as, placed the index, middle and ring fingers one inch below the wrist and feel the pulse. The index, middle and ring fingers indicate the *Vatham*, *Piththam* and *Kabham* respectively.

The flowing verses indicating that, which hand need to use to read *naadi*.

‘மருவுமெய்க் குற்றநாடி மதித்திடில் வலக்கை மாந்தர்
அரிவையர்க் கிடக்கைநாடி யமுக்கியே சுட்டாய் மூட்டி
விரைவினில் வெய்யவாத மிகநடு விரலிற் பித்தந்
தருமணி விரலிலய்யந்தானென வறிந்து சொல்லே’

(Venkatrajan, 2014, verse 49)

‘தானென வுலகத்துள்ளே தயங்கிய நாடிபார்க்கில்
வானென மின்னேகேளாய் வரும்புலன் சொல்லக்கேளு
நானெனும் புருடர்க்கெல்லாம் நாடித்தான் வலக்னையாகும்
தேனெனு மாதர்க்கெல்லாந் திடம்பெற விடக்கைசித்தே’

(*Agasthiyar vaiththiya sillarai kovai*, verse 30)

‘கண்டாயே ஆடவர்க்கு வலக்கரமு மாகும்
கருவுடனே பெண்பிள்ளைக்கு இடக்கரம் என்றேன்
வெண்டான இடக்கையை வலக்கை யாலே
மேலான வலக்கையாலே
நண்டாகக் கைதேய்த்து நெட்டி வாங்கி
நாட்டுமூ விரலுக்கு விரலண் டாமை
அண்டாமல் நெட்டாவிட்டு பாரு
அசைவாகும் வாதபித்த சிலேத்தும மாமே’

(*Agasthiyar nool thirattu)*

The above verses indicate that the right hand need to use to read *naadi* in male and the left hand for female.

Ten locations indicated to read *naadi* in *Thirumoolar vaithiyam karukkadai* – 600 and the following verse indicates the locations as,

‘தாதுமுறைகேள் தனித்தகுதிச்சந்து
ஓதுறுகாமியம் உந்திநடுமார்பு
காதுநடுமூக்குக் கண்டங்கரம்புருவம்
போதுறுமுச்சி புகழ்பத்தும்பார்த்திடே’

(Verse 54 *Thirumoolar vaithiyam karukkadai* – 600)

The verses state the ten locations as *kuthisanthi* (ankle), *kamiyam* (inguinal region), *unthi* (abdomen), *marbu* (chest), *kathu* (ear), *mooku* (nose), *kandam* (throat),

karam (arm), *purum* (eye brow) and *uchchi* (frontanella). Even though *Kai* (upper limb) is the common place to read *naadi* for all and the following verse indicating the statement as,

‘கூர்த்திடவே கன்னமது சுழியிற் றானும்
குறிப்பான கைகளிலும் மர்மஸ்தானந் தன்னில்
சார்ந்திடவே கணுக்காலி னுட்புறத்தில்
சாரிவாகப் பெருவிரற்கால் மேல தாக
தேர்ந்திடவே நாடிதனை யுபயோ கிக்கத்
தெளிவாக மாந்தருக்குச் செப்ப லாச்சு
பேர்ந்திடவே சகலருக்குங் கரத்தி னாடி
பேசினார் பிரமமுனி பேசி னாரே’

(*Thirumoolar vaithiyam karukkadai* – 600, verse 54)

In disease condition, if the *Vatham* and the *Piththam* increase the *naadi* can be felt between the index and middle finger, if the *Vatham* and the *Kabham* increase the *naadi* can felt between index and ring finger and if the *Piththam* and the *Kabham* increase the *naadi* can be felt between middle and ring finger (Vasutheva Sasththirikal and Subramanya Sasththirikal, 2014).

3.8.4.1 The sign and symptoms for *thontha naadi* (combination of two *naadi*) according to *Agasthiyar vaiththiya sillarai kovai*

Signs and symptoms of *Vathapiththam*

‘வாதத்திற் பித்தமாகில் வாயது குழறிபேசும்
பேதித்துக் குளிருங்காலில் வீக்கமும் பெருகவுண்டாம்
தாதுற்ற புத்திதானுந் தடைப்படுந் தடங்கண்மாதே
கோதுற்ற வயிறுவிம்மிக் குறடனைப் புரட்டுந்தானே’

(*Agasthiyar vaiththiya sillarai kovai*, 2010, verse 5; *Agasthiyar munivar arulichcheitha vaiththiya raththna surukkam 360 (moolamum uraiyum)*, verse 5)

The above verse states, strangely speech, chillness in leg, swelling, mentally disturbance and abdominal discomfort occur when both the *Vatham* and the *Piththam* increase in the body.

In addition another literature explains as,

‘இசைந்திடும் பித்தம் ரண்டும்
ஈரை வாத மோடில்
பசிந்திடும் வயிறும் நெஞ்சு
பறந்தெறிந் தழன்று மெய்தான்
வசங்கெடுந் தலைகி றுக்கும்
மயங்கிடு முடல்வெ தும்பும்
முசிந்திடும் பித்த வாத
முறைமையை அறிந்து கொள்ளே!’

(*Agasthiyar maruththuvam* (*Tamil maruththuva nool varisai* -15) *olaichchuvadith thokuppu nool,* verse- 58)

The stanza states if *Vatham* and *Piththam* increase excessive appetite, burning sensation in chest and abdomen, giddiness, faintness and feeling of heat is experienced in the body.

Further *Dhanvathiri vaiththiyam* (2014) explains in following verse that, ache and pain in the body, thirst, worries and indigestion occur, when *Vatham* and *Piththam* increase simultaneously.

‘அந்த வாதங்கள் ரண்டு மடுத்திடும் பித்தமொன்றுந்
தொந்தித்து நடக்குமாகிற் நோன்றிடுங் குணத்தைக் கேளாய்
வந்துநொந்ததுதான் விம்மி வலித்திடும் தாகமேகஞ்
சிந்தனை மிகவுண்டாகும் புசிப்பையுஞ் செரியாதாக்கும்
பைந்தொடி வாதபித்த மென்றுதான் பகரலாமே’

(*Dhanvathiri vaiththiyam,* verse 27)

Signs and symptoms of *Piththavatham*

Pain in the occipital lobe, arm and leg, emaciation, tremor, thirst, pain due to fever, confusion and anxiety occur when *Piththam* and *Vatham* increase simultaneously and the condition is described in the following verse,

‘பித்தத்தில் வாதமாகிற் பிடரியுங் காலுங்கையுங்
குத்தது போலேயர்குங் குறுகிமெய் பதறும்பின்னே
அத்தியா யுலருமேனி யாகமும் சுரத்தால்நோவாம்
புத்தியு மடியுமிக்கப் பொறுமைபோய் கோபமாமே’

(*Agasthiyar vaiththiya sillarai kovai*, 2010, verse 8;
Agasthiyar munivar arulichcheitha vaiththiya raththna surukkam 360 (moolamum uraiyum), verse 7)

The below verse from *Dhanvathiri vaiththiyam* (2014) documents that, ache and pain in the body, burning sensation in the chest, dryness of the mouth and burning sensation in micturition occur, when both *Piththam* and *Vatham* increase in the body.

‘எண்ணிய வாதமொன்றும் பித்தமிரண்டெழுந்ததாகில்
புண்ணென வுடம்புநோவாம் புகையெழ வெரியும் நெஞ்சு
திண்ணமாய் நாவரண்டு சிறுத்தநீர்க் கடுத்துவிழும்
அண்ணலார் உரைத்தவுண்மை யாயுரு வேந்தனே’

(*Dhanvathiri vaiththiyam*, verse 30)

Signs and symptoms of *Vathakabham*

The below verse points out the symptoms of increase *Vatham* and the *Kabham* as pain with swelling, mental disturbance, head ache, changes in mind, pallor and the occurrence of oedema.

‘வாதத்தில் சேத்மமாகில் வலியொடு வீக்கமுண்டாம்
பேதித்துத் தலையிடித்து பிணங்கிய குணங்கள்வேறாய்த்
தீதுற்ற மெய்வெளுத்துத் திடமுடன் சனஞ்செல்லா
பேதித்து நாவுபேசும் பெருகவே வீக்கமுண்டாம்’

(*Agasthiyar vaiththiya sillarai kovai*, 2010)

In addition, the following verses explain the characters of increased *Vatham* and *Kabham* together.

‘உயர்ந்திடும் வாதம் ரெண்டும்
ஒருசி லேட்டும தாகில்
அயர்ந்திடும் கைகால் நொந்து
அடிவய றதைத்துக் காட்டும்
தியங்கிடுந் தாது கெட்டு
வுதிரங்களுங் குறைந்து வாடும்
மயங்கிடு வாதர் தோடு
மருவிய அய்யந் தானே’

(*Agasthiyar maruththuvam* (*tamil maruththuva nool varisai* -15) *olaichchuvadith thokuppu nool,* verse 60)

The verse states that, tiredness, pain in arm and leg, enlargement of lower abdomen and loss of *thathu* and blood occur when the *Vatham* and the *Kabham* increases together.

Further *Dhanvathiri vaiththiyam* (2014) explains in the following verse that, pain in the body, numbness in the hand and foot and abdominal pain with distension experience in body when increase *Vatham* and *Kabham* .

‘மானனாய் வாதம் ரண்டுஞ் சிலேத்ம மொன்றெழுந்த தாகி
லானதோர் சரீரம் நோவாம் அங்கைகால் திம்ர்த்துக் காட்டு
மூனமாமுதரத்துள்ளே வூதையு மிகுந்து விம்மும்
பானலங் கண்ணாய் வாத சிலேத்பனம் பரிந்துபாரே’

(*Dhanvathiri vaiththiyam*, verse 32)

Signs and symptoms of *Kabhavatham*

The following verse documents, pain in the leg and occipital region and difficulty in speech experience, when the *Kabham* and *Vatham* increase together.

‘வாட்டிமுஞ் சேத்துமத்தில் வந்திடு வாதமாகில்
நாட்டிய கால்கள்போல நரம்பெலாம் வலித்துநிற்கும்
கூட்டிய பிடரிதானுங் குன்றவே வலிக்குமாகில்
நாட்டிய விழியுமெல்லாம் நாக்குவாய் குழறுந்தானே’

(*Agasthiyar vaiththiya sillarai kovai*, 2010, verse 10; *Agasthiyar munivar arulichcheitha vaiththiya raththna surukkam 360 (moolamum uraiyum)*, verse 10)

In addition the below verse describes that, disorders in abdomen, emaciation and pain in the body occurs when increase *Kabham* and *Vatham* together.

‘பாரித்த அய்யம் ரெண்டும்
பரிந்தொரு வாத மோடில்
கறித்து குளுத்து கூசிக்
கும்பியில் குணக்கே டாகும்
நேரொத்த காயம் வற்றி
நேறிதலை திரேகம் நோகுஞ்
சீறுற்ற அய்ய வாதந்
தொந்திப்பாந் திரிநல் மாதே!’

(*Agasthiyar maruththuvam* (*tamil maruththuva nool varisai* -15) *olaichchuvadith thokuppu nool,* verse 62)

Further *Dhanvathiri vaiththiyam* (2014) documents in the following verse that, increase of appetite, the patient wish to eat a lot of sweet and burning sensation of the body experienced, when increase *Kabham* and *Vatham* together.

‘சேப்பிய சேத்மம் ரண்டும் வாதமு மொன்று சேரில்
வெப்புறு கபமேலிட்டு இனிப்பையே மிகவும் வேண்டும்
தப்பிலாப் பசியுமுண்டாந் தபனமே பற்றிநிற்கும்
இப்படிக் குணங்கள் கண்டால் சிலேத்தும வாதமென்னே’

(*Dhanvathiri vaiththiyam*,verse 29)

3.8.5 *Manikkadai nool*

Manikkadai nool is one of the diagnosis and prognosis methods of disease in the Siddha system of medicine. The *Pathinen Siddhar arulichcheitha naadi saasthiram* (2012) explaines the procedures to conduct *manikkadai* as measuring the circumference of the forearm above the four finger breadth from the wrist using a thread. There after the length of the circumference measure using the four fingers except thumb. The sum of the finger breadth (in number) indicates the disease. The following verse describes the procedures of measuring the *Manikkadai nool*.

‘மணிக்கடை கால்விரல் தள்ளிவுண்மையாய்
மணிக்கிடை கயறுபோட் டளந்துபார்க்கையில்
கணித்திடும் விரல்தனை கண்டுசொல்லவே
பிணித்திடு நோய்களை பிரித்துரைக்குமே’

(*Pathinen Siddhar arulichcheitha naadi saasthiram*)

Further *Pathinen Siddhar arulichcheitha naadi saasthiram* (2012) documents in the following verse that, reduction of finger breadth indicates the disease status.

‘குரைந்துவிரக்கிடை யிசைந்துகாண்கிடில்
உரைந்துவெண்பிணி வுடம்பிற்சார்ந்திடும்…..’

(*Pathinen Siddhar arulichcheitha naadi saasthiram*)

The following verse documents, the sum of the finger breadth is eight and a quarter, indicates piththa disorders, fever, pramiyam, kamiyam amd disoreder of head.

‘காட்டியயெட்டொடு கால்விரற்கடை
கூட்டியபித்தாய் குரைசுரமெயில்
நாட்டியபிரமியம் நவிலுங்காமியம்
வாட்டியசிர சில்நோய் வருமோராண்டில்’

(*Pathinen Siddhar arulichcheitha naadi saasthiram*)

3.9 Modern aspect of diabetes mellitus (DM)

3.9.1 General considerations

DM is a metabolic disorder characterized by the presence of chronic hyperglycaemia accompanied by greater or lesser impairment in the metabolism of carbohydrates, lipids and proteins (Baynest, 2015). DM is probably one of the oldest diseases known to man. It was first reported in Egyptian manuscript about 3000 years ago (Ahmad, 2002). The World Health organization states that, diabetes is a serious, chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces (WHO, 2016). Prevalence of type 2 DM has been increasing steadily all over the world (Abdulfatai, 2012). Raised blood glucose, a common effect of uncontrolled diabetes, may, over time, lead to serious damage to the heart, blood vessels, eyes, kidneys and nerves (WHO, 2016). Diabetes is an important public health problem and considers as one of the four priorities of non communicable diseases (Geneva, 2011). Both the number of cases and the prevalence of diabetes have been steadily increasing over the past few decades (WHO, 2016).

3.9.2 Global burden

Globally, an estimated 422 million adults were living with diabetes in 2014, However 108 million adults recorded as diabetes in 1980. The global prevalence of diabetes has nearly doubled since 1980, rising from 4.7 % to 8.5 % in the adult population. It is estimated that 439 million people would have type 2 DM by the year 2030 (Abdulfatai, 2012). Diabetes caused 1.5 million deaths in 2012. It was the eighth leading cause of death among both sexes and the fifth leading cause of death in women in 2012 (WHO, 2016). Higher than optimal blood glucose caused an additional 2.2 million deaths, by increasing the risks of cardiovascular and other diseases (WHO, 2016).

The Fig.3.1 has shown the trends in prevalence of diabetes, 1980 – 2014, by country income group.

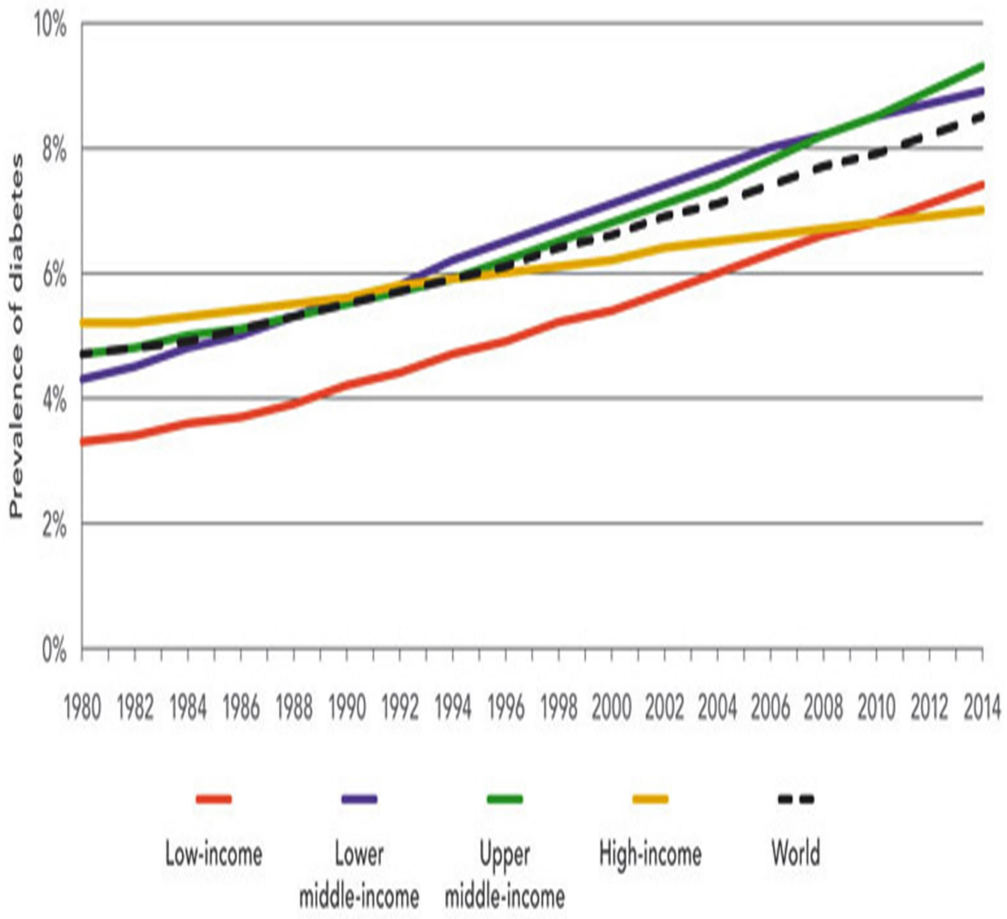

Fig. 3.1. Trends in prevalence of diabetes, 1980 – 2014, by country income group

The old classification is insulin dependent (IDDM) or non-insulin dependent (NIDDM) which were proposed by WHO in 1980 and 1985 have disappeared (WHO, 1999) .The new classification system identifies four types of DM; type 1, type 2, other specific types and gestational diabetes in 1985 (WHO, 1999).

Type 1 diabetes (Insulin dependent, juvenile or childhood onset diabetes) is characterised by deficient insulin production in the body. People with type 1 diabetes require daily administration of insulin to regulate the amount of glucose in their blood (WHO, 1999).

Type 2 diabetes results from body's ineffective use of insulin. Symptoms may similar to type I diabetes, but are often less marked or absent. As a result, the disease may go undiagnosed for several years, until complications have already arisen (WHO, 1999). Gestational diabetes is an operational classification identifying women who develop DM during gestation.

Other specific type (monogenic diabetes), types of DM of various known etiologies are grouped together to form the classification called other specific types. This group include persons with genetic defects of beta-cell function or with defects of insulin action, persons with disease of exocrine pancreas or cyctic fibrosis etc.

Table 3.3. Characteristics of the common types (types I and II) of diabetes (Harikumar *et al*, 2015)

Characteristics	Type 1	Type 2
Age	Childhood	Pubertal
Onset	Acute, severe	Mild,severe - often insidious
Insulin secretion	Very low	Variable
Insulin sensitivity	Normal	Decreased
Insulin dependence	Permanent	Temporary - may occur later
Genetics	Polygenetic	Polygenetic
Proportion of those with diabetes	80 %	10 – 20%
Association : Obesity	No	Strong
Acanthosis nigricans	No	Yes
Autoimmune etiology	Yes	No

3.9.3 Clinical features of Diabetes mellitus general symptoms

Most of the symptoms are similar to both types of diabetes but they vary in their degree and develop more rapidly in type 1 diabetes and more typical (Baynest, 2015).

Clinical features of type 1 diabetes mellitus

Weight loss, polyuria, polydipsia, polyphagia, constipation, fatigue, cramps, blurred vision and candidiasis (Zimmet, 1992). Long lasting type 1 DM patients may susceptible to microvascular complications (Hove *et al.,* 2004) and macrovascular disease (coronary artery, heart and peripheral vascular diseases) (Pittas, 2009).

Clinical features of type 2 diabetes mellitus

Most of the Type 2 patients diagnosed because of complications or incidentally. More possibility with a high risk of large vessel atherosclerosis commonly associated with hypertension, hyperlipidaemia and obesity. Most of the patients with type 2 diabetes die from cardiovascular complications and end stage renal disease (Sekikawa, 1993).

3.9.4 Pathogenesis and pathophysiology of diabetes mellitus

There is a direct link between hyperglycemia, physiological and behavioural responses. Whenever there is hyperglycemia, the brain recognises it and sends a message through nerve impulses to pancreas and other to decrease its effect (Patidar, 2011).

Diabetes mellitus - Type 1

Type 1 DM is characterized by autoimmune destruction of insulin producing cells in the pancreas by CD4+ and CD8+ T cells and macrophages infiltrating the islets. Approximately 85% of patients have circulating islet cell antibodies, and the majorities also have detectable anti-insulin antibodies before receiving insulin therapy. The autoimmune destruction of pancreatic β cells, leads to a deficiency of insulin secretion which results in the metabolic derangements associated with type 1 DM in addition to the loss of insulin secretion, the function of pancreatic α – cells is also abnormal and there is excessive secretion of glucagons in type 1 DM. Normally, hyperglycemia leads to reduced glucagons secretion, however, in patients with type 1 DM glucagons secretion is not suppressed by hyperglycemia. The resultant inappropriately elevated glucagons levels exacerbate the metabolic defects due to insulin deficiency. Althougth insulin deficiency is primary defect in type 1 DM, there is also a defect in the administration of insulin. Deficiency in insulin leads to uncontrolled lipolysis and elevated levels of free fatty acids in the plasma, which suppresses glucose metabolism in peripheral tissues such as skeletal muscle. This impairs glucose utilization and insulin deficiency also decreases the expression of a number of genes necessary for target tissues to respond normally to insulin such as glucokinase in liver and the GLUT 4 class of glucose transporters in adipose tissue

explained that the major metabolic derangements, which result from insulin deficiency in type 1 DM are impaired glucose, lipid and protein metabolism (Baynest, 2015).

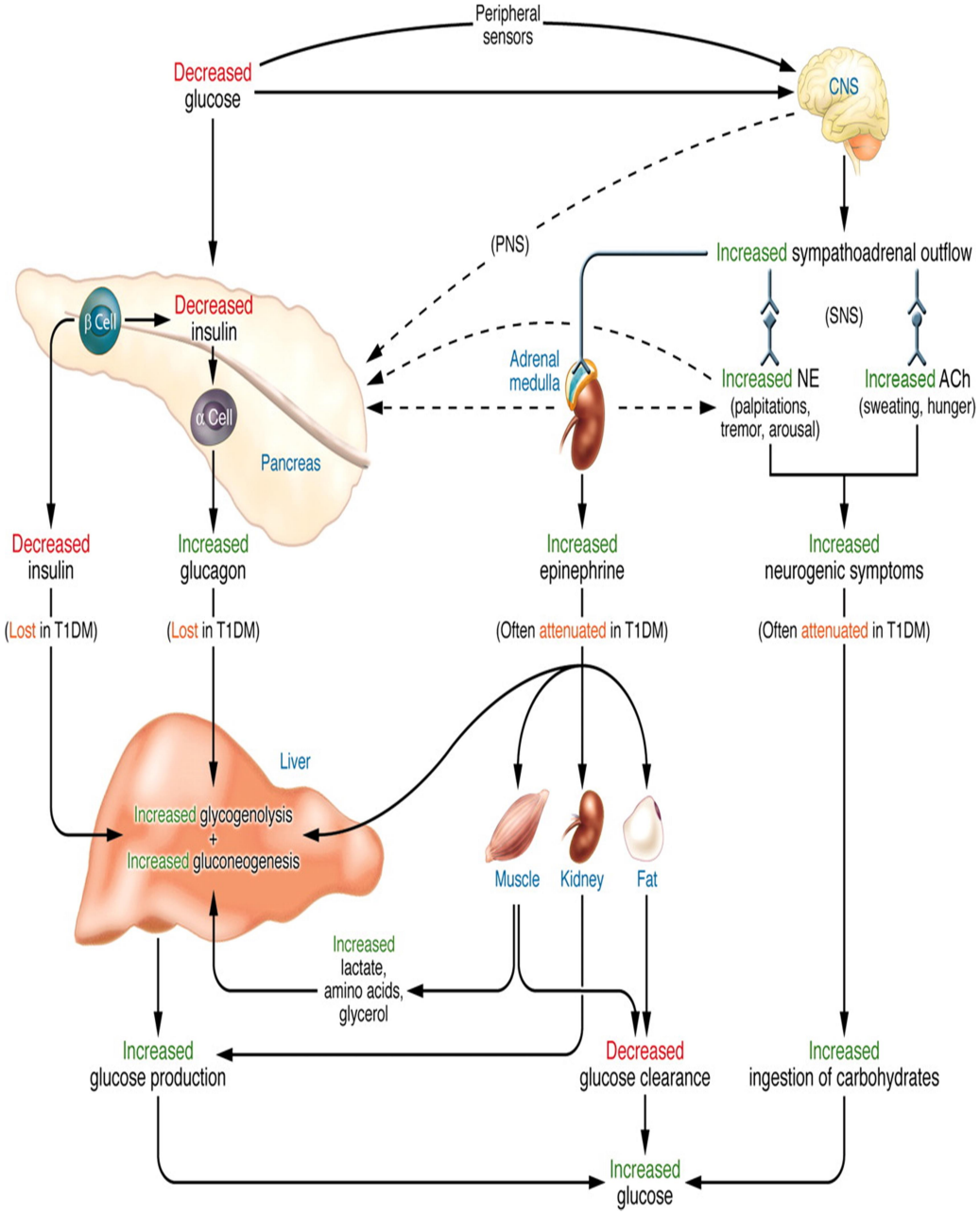

Fig.3. 2. Physiologic and behavioural response of hyperglycemia (Baynest, 2015)

Diabetes mellitus - Type 2

In type 2 DM, these mechanisms break down, with the consequence of the two main pathological defects in type 2 diabetes that are impaired insulin secretion through a dysfunction of the pancreatic β – cells and impaired insulin action through insulin resistance. In situations where resistance to insulin predominates, the mass of β – cells undergoes a transformation capable of increasing the insulin supply and compensating for the excessive and anomalous demand. The plasma insulin concentration usually is increased, although relative to the severity of insulin resistance, the plasma insulin concentration is insufficiency to maintain normal glucose homeostasis. Keeping in mind the intimate relationship between the secretion of insulin and the sensitivity of hormone action in the complicated control of glucose homeostasis, it is practically impossible to separate the contribution of each to the etiopathogenesis of type 2 DM.

Insulin resistance and hyperinsulinemia eventually lead to impaired glucose tolerance. Except for maturity onset diabetes of the young (MODY), the mode of inheritance as an autosomal dominant trait, may result from mutations in glucokinase gene on chromosome 7p. MODY is defined as hyperglycemia and treatable for over five years without insulin in cases where islet cell antibodies are negative (Baynest, 2015).

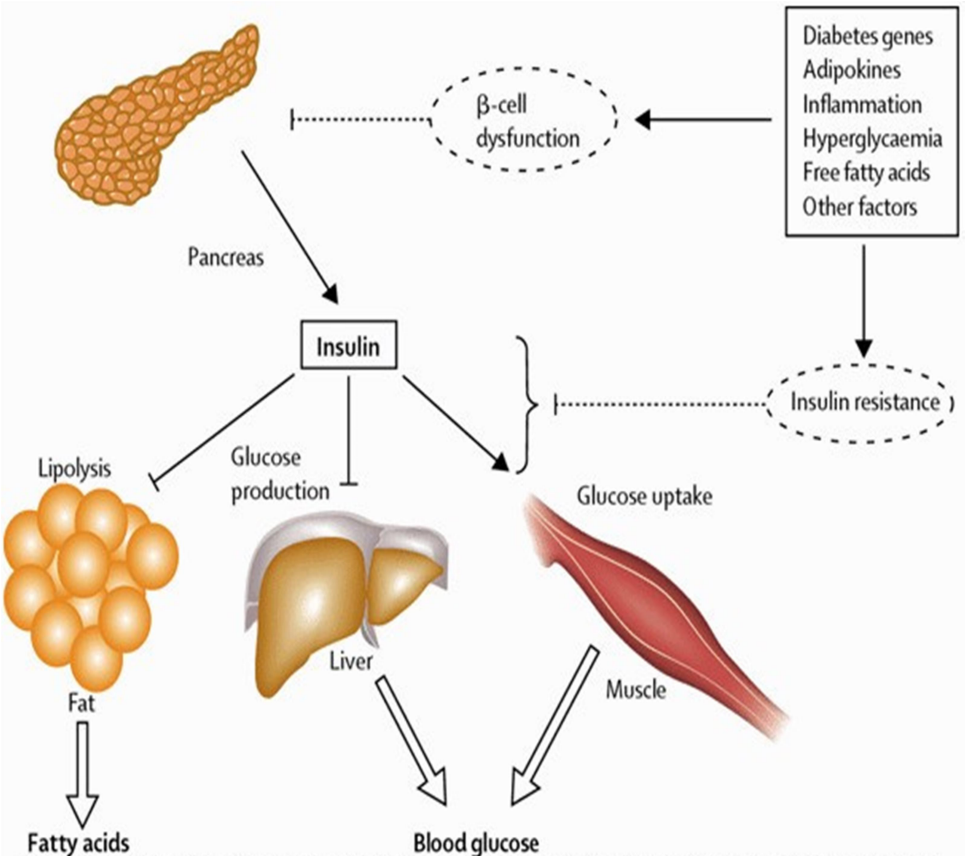

Fig. 3.3. Pathophysiologic of hyperglycemia and increased circulating fatty acids in type II (Baynest, 2015)

3.9.5 Risk factors of diabetes mellitus

Diabetes mellitus - Type 1

The exact cause for the type 1 DM is unknown. It is generally agreed that the type 1 DM is the result of a complex interaction between genes and environmental risk factors (Baynest, 2015). Family history, genetics and geography-tends to increase as travel away from the equator are some known risk factors for the type 1 DM. In addition viral exposure-exposure to Epstein – Barr virus, coxsackie virus, mumps virus or cytomegalo virus may trigger the autoimmune destruction of the islet cells or the virus may directly infect the islet cells- may cause type 1 DM. Drinking water that contains nitrates may increase the risk. Having a mother younger than 25 age, when she gave birth to a child or having a mother who had preeclampsia during pregnancy, that child after birth may have a risk for the disease. Being born with jaundice and

having a respiratory infection just after birth may be a risk for the type 1 DM (Harikumar *et al*., 2015).

Diabetes mellitus – Type 2

Researchers do not fully understand why some people develop type 2 diabetes and others do not. Some factors increase the risk of the type 2 DM. Overweight is a primary risk factor for type 2 diabetes. In addition fat distribution especially in abdomen, inactivity, family history and race – Blacks, Hispanics. American Indians and Asian Americans are more prone to develop type 2 DM, age – older, especially after age 45, probably because people tend to less exercise, lose muscle mass and gain weight as they age and gestational diabetes may influence to cause type 2 DM (Harikumar *et al*., 2015).

3.9.6 Complications

Diabetes of all types can lead to complications in many parts of the body and can increase the overall risk of dying prematurely. When diabetes is not well managed, complications develop that threaten health and endanger life. Acute complications are a significant contributor to mortality. Abnormally high blood glucose can have a life threatening impact if it triggers condition such as ketoacidosis in type 1 and 2, hyperosmolar coma in type 2. Abnormally low blood glucose can occur in all types of diabetes and may result in seizures or loss of consciousness. Over time diabetes can damage the heart, blood vessels, eyes (diabetic retinopathy), kidneys (diabetic nephropathy) and nerves (diabetic neuropathy) and increase the risk of heart disease and stroke. Such damage can result in reduced blood flow, which combined with nerve damage in the feet- increases the chance of foot ulcers, infection and the eventual need for limb amputation. In pregnancy, poorly controlled diabetes increases the risk of foetal death and other complications like congenital malformation, still birth and maternal mortality (WHO, 2016).

Other complications are impaired growth and development, lipodystrophy, necrobiosis, non-alcoholic fatty liver disease, infections, limited joint mobility, odema and also it is associated with autoimmune conditions like hypothyroidism,

hyperthyroidism, celiac disease, vitiligo and primary adrenal insufficiency (Baynest, 2015).

3. 9.7 Diagnosis of diabetes mellitus

The identification of patient with diabetes or pre-diabetes by screening allows for earlier intervention, with potential reductions in future complication (WHO, 2016).

1. Random plasma test

   The simplest test does not require fasting before the test. If 200 or more 200 mg/dL of blood glucose it probably indicates DM but has to be reconfirmed (Baynest, 2015).

2. Fasting plasma glucose test

   Eight hours fasting hould be needed before taking the test. Blood glucose more than 126 mg/dL on two or more tests conducted on different days confirms a diabetes (Gillett, 2009).

3. Postprandial Blood glucose test

   Measures blood glucose levels two hours after eating a meal. Postprandial blood glucose is usually done in people who have symptoms of hyperglycemia, or when the results of a fasting glucose test suggest possible diabetes, but are inconclusive. Values of 200 mg/dL or more indicate diabetes (Harikumar *et al.*, 2014).

4. Oral glucose tolerance test

   When random plasma glucose test is 160 – 200 mg/dL and the fasting plasma test is 110 – 125 mg/dL, then this test is conducted. This blood test elevates body's response to glucose. This test requires fasting at least eight but not more than sixteen hours. Fasting glucose level is determined, and then gives 75 g of glucose, 100 g for pregnant women. The blood is tested every 30 minutes to one hour for two or three hours. This test is normal if the glucose level at two hours is less than 140 mg/dL. A fasting level of 126 mg/dL or greater and

two hour glucose level of 200 mg/dL or higher confirms a diabetes diagnosis (Baynest, 2015).

5. Glycated proteins

   Proteins react spontaneously in blood with glucose to form glycated derivatives. The extent of glycation of proteins is controlled by the concentration of glucose in blood and by the number of reactive amino groups present in the protein that are accessible to glucose for reaction. All proteins with reactive sites can be measured in blood is a marker for the fluctuation of blood glucose concentrations during a certain period. From a clinical diagnostic point glycated proteins with a longer life time in blood are of interest, since they reflect the exposure of these proteins to glucose for longer periods (Baynest, 2015).

6. Glycated haemoglobin

   The life span of haemoglobin in vivo is 90 -120 days. During this time glycated haemoglobin A (HbA1c) forms, being the ketoamine compound formed by combination of haemoglobin A and glucose. Several subfractions of glycated haemoglobin have been isolated. Of these, glycated haemoglobin A fraction HbA1c is most interest serving as a retrospective indicator of the average glucose concentration even if the patient is not in a fasting state. HbA1c is recommended as an essential indicator for the monitoring of blood glucose control. The blood HbA1c $\geq$ 6.5 % is considered as diabetes (Selvin *et al*., 2010).

7. Fructosamine test

   Albumin is the main component of plasma proteins. As albumin also contains free amino groups, non – enzymatic reaction with glucose in plasma occurs. Therefore glycated albumin can similarly serve as a marker to monitor blood glucose. Glycated albumin is usually taken to provide a retrospective measure of average blood glucose concentration over a period of 1 to 3 weeks. Reference interval: 205 – 285 μmol/L (Baynest, 2015).

8. Chemical tests

   This involves testing the urine with the Benedict's reagent. Results indicate the person having diabetes based on the colour formation (Harikumar *et al*., 2014).

   a) Light colour – normal
   b) Parrot green colour = > 120 mg/dl
   c) Dark yellow colour = > 180 mg/dl
   d) Reddish brown colour = +++ >250 mg/dl
   e) Brown colour = ++++ > 350 mg/dl

9. Diasticks

   These are strips that are used to indicate the person having DM or not. These strips tested with urine and based on the colour change only diagnosis the DM (Harikumar *et al*., 2014).

10. Glucometers

    These meters are also involving in diagnosing the DM. Within the fraction of seconds these will give results about blood glucose levels (Harikumar *et al*., 2014).

3.9.8 Preventing diabetes

Type 1 diabetes cannot be prevented with current knowledge. Effective approaches are available to prevent type 2 diabetes and to prevent the complications and premature death can result from all types of diabetes. It can preventable by regular exercise, healthy diet, reduce sedentary behaviours, unhealthy foods and beverages, avoiding smoking and controlling blood pressure (WHO, 2016).

CHAPER 4

MATERIALS AND METHODS

4.1 General procedure

4.1.1 Study protocol

The comparative study was carried out to assess the Siddha diagnostic methods as *neerkuri*, *neikuri*, *naadi* and *manikkadai* with modern diagnostic methods in NR.

4.1.2 Selection of the subjects

Primary screening was done randomly at outpatient department (OPD) and inpatient department (IPD) at Government Siddha Medical College (GSMC), Palayamkottai, Tirunelveli, Government District Headquarters Hospital (GDHH), Thoothukudi and Gopalasamudram village (GSV), Tirunelveli. Sixty apparently NR patients were enrolled for the study through screening according to the inclusive and exclusive criteria after getting their concern.

4.1.2.1 Inclusion criteria

Both sexes with age of 18 to 64 (Axel, Roland and Kerstin, 2002) were selected with the symptoms with increased volume of urine output, immediate changes in weight and increase appetite. Further the patients present with the urine glucose positive and fasting blood sugar (FBS) ≥ 126 mg/dL (≥ 7 mmol/L) or Postprandial Blood sugar (PPBS) ≥ 200 mg/dL (≥ 11.1 mmol/L) (WHO, 2006) or HbA1c ≥ 6.5 % (WHO, 2016) were consider as inclusive criteria. In addition, no history of other illness and the subjects, who are not taking medicines also considered when the selection of the subjects. The subjects, who satisfied the all condition described above were selected for the study.

4.1.2.2 Exclusion criteria

The patient below age of 18 and above 64, FBS <126 mg/dL (7 mmol/L) or PPBS < 200 mg/dL (<11.1 mmol/L) (WHO, 2006) or HbA1c < 6.5 % (WHO, 2016), pregnant and lactating mothers, diabetic with other diseases and the subjects who are on antidiabetic medication were excluded.

4.1.2.3 Criteria for withdrawal

The subjects could withdraw from the study, if the patient could not follow the necessary instructions or could not co-operate the study or if serious condition arises, which required urgent treatment with other drugs or therapy. The investigator remarked the probable cause of withdrawal and provided the possible medical treatment or referred the patients to the suitable place for further management of the illness, if serious condition arised. In addition if the patient wishes as to withdraw during the course of the study, the patient could withdraw from the study without hesitation.

In the circumference of discontinuation of the study, related all data were erased and the withdrawn patients replaced by new patients according to the inclusive and exclusive criteria.

Case report form I (attached in annexure IV, pp No. 116) used for the selections of the subjects. .

4.2 Study design

At the baseline visit, the patients were screened according to the case report form I (annexure IV, pp No. 116) and selected according to inclusion and exclusion criteria after getting the subjects consent. There after detail history was taken from the selected subjects. Physical and systemic examination was done and the details recorded using case report form II (annexure IV, pp No. 118). In addition the laboratory investigations were done and the data recorded in the case report III (annexure IV, pp No. 121).

The subjects were investigated according to the Siddha and modern diagnostic methods in their first visit. *Neerkuri*, *neikuri*, *naadi* and *manikkadai* were examined according to Siddha diagnostic methods. In modern aspect, FBS or PPBS, urine full report (colour, appearance, specific gravity, reaction (pH), protein, sugar, ketones, urobilinogen and bile pigments), serum creatinine and liver function test were investigated. All data was recorded in case report III (annexure IV, pp No. 121).

The selected subjects were directed to the OPD at GSMC, Palayamkottai, Tirunelveli and GDHH, Thoothukudi for the treatment with Anti *Neerizhivu mathumeha* drug *mathumega chooranam*. The subjects selected from GSV, Tirunelveli were directed to OPD at GSMC, Palayamkottai, Tirunelveli for the above treatment. After commencement of the treatment the patients were subjected to Siddha and modern investigations again, at every visits. The *neerkuri*, *neikuri*, *naadi, manikkadai*, blood sugar, urine glucose, appearance, specific gravity and reaction (pH) were investigated in every week for 6 weeks. The case report form IV (annexure IV, pp No. 125) was used to record the data.

Flow chart of the study design

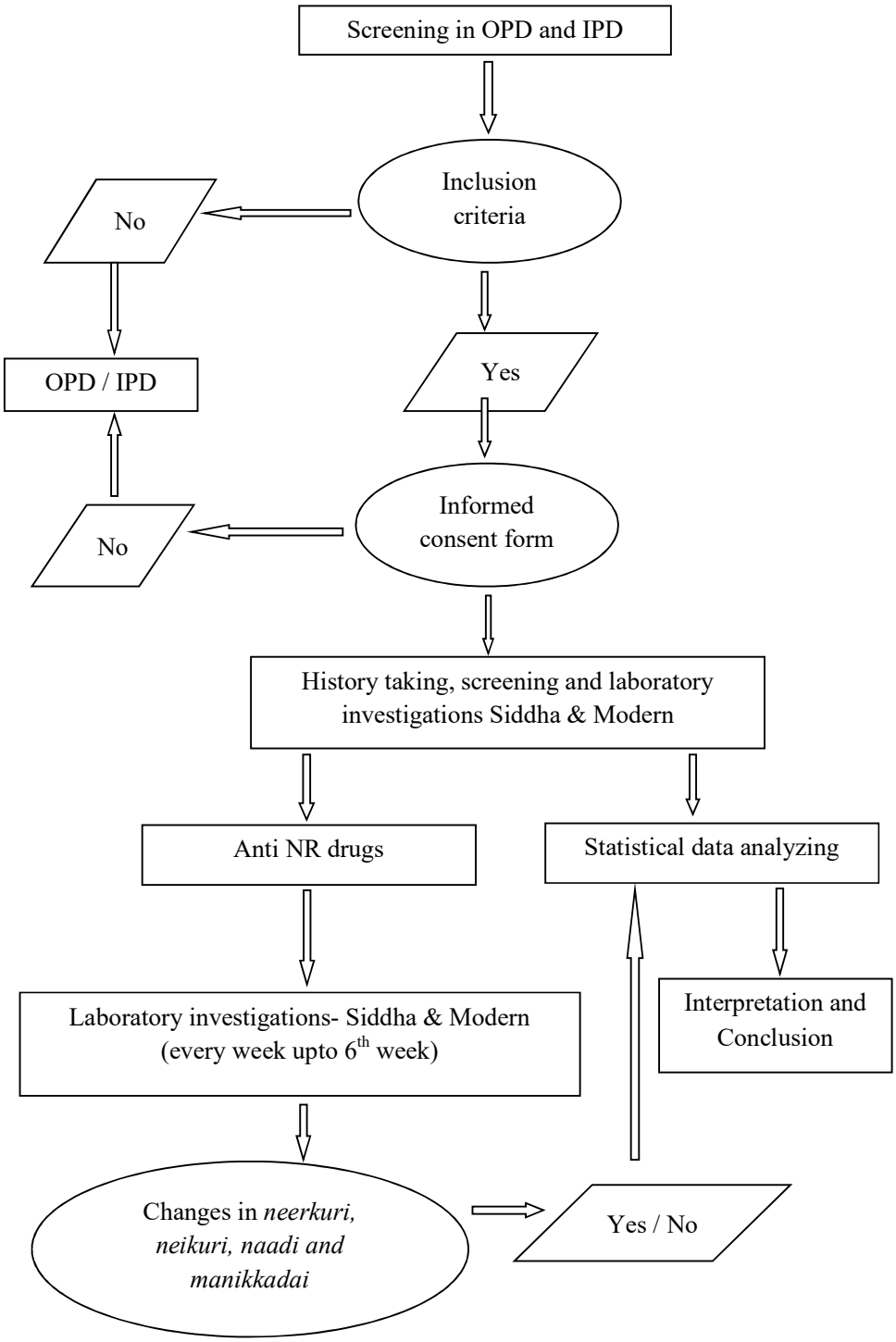

Fig. 4.1. Flow chart of methodology

4.3 Statistical analysis

Completed questionnaires were checked before data entry. Data was entered and analyzed on Statistical Package for the Social Science (SPSS) version 18.0 statistical software (SPSS Inc., Chicago, IL, USA). The One- Sample Kolmogorov-Smirnov was used to test the distribution of variables. Characteristics of patients were examined by chi square test for categorical variables and by Student's *t* - test and ANOVA for continuous variables. Associations were tested by Pearson's correlation coefficient. Statistical significance was set at $p< 0.05$.

4.4 Laboratory investigations

Blood sugar was investigated using glucometer (one touch ultra-easy, range 20-600 mg/dL) and urinalysis reagent strip (Mission URS7010029) used for urine analysis. In addition the serum creatinine, Serum glutamic-oxaloacetic transaminase (SGOT) and Serum glutamic pyruvic transaminase (SGPT) tested at laboratories situated at Palayamkottai and Thoothukudi.

4.4.1 Collection of blood and blood investigations

Blood samples (5 mL) were withdrawn from the arm of each patient under safe and sterile condition, by a trained laboratory technician. A tourniquet was used to increases the visibility of veins. An aliquot of blood (5 mL) was transferred to an Ethylenediaminetetraactic acid (EDTA) coated tube and gently rotated (to avoid hemolysis) to mix with the anticoagulant. The blood samples were analysed for serum creatinine, SGOT and SGPT at the baseline visit.

Eight hour fasting or 2 hour post prandial blood sample was obtained by pricking the tip of the ring finger (or suitable finger) of each patient using strile needle under safe and sterile conditions. The blood sample was analysis for blood sugar using glucometer (one touch ultra-easy, range 20-600 mg/dL).

4.4.2 Urine analysis – modern method

Urine report was assessed by analyzing specific gravity, reaction (pH), protein, sugar, ketones, urobilinogen, bile pigments, nitrate, leucocytes and blood using urinalysis reagent strip (Mission URS7010029) and recorded.

4.4.3 Urine analysis – Siddha method

4.4.3.1 *Neer kuri*

Collections of urine - clean vessels were used to collect the urine from the patients and transfer the urine into the test utensils when conducting the test *neerkuri*.

Neerkuri was assessed by analyzing the colour, odour, froth and the sedimentation of urine (Shanmugavelu, 1967), to the urine samples collected form the patients and recorded.

4.4.3.2 *Neikuri*

The urine was transferred into 3.5 inch (9 cm) petri dish. A drop of gingili oil derived from black colour sesame seeds applied on the surface of the urine, within one and a half an hour from the collection of the urine (Shanmugavelu, 1967). The nature of spread, shape of the spreading of oil on the surface of the urine, the time taken to start (1^{st} dot appear) and disappear the scatter of the *neikuri* were observed and recorded.

4.4.4 *Naadi*

The right or left elbow of the subject was griped with physicians' left hand. Then the fingers of the subject were snap of the knuckles (*netti vanguthal*) by the right fingers of the physician. Thereafter the palm of the subject was rubbed with general force. Then three fingers of the right hand, namely the index, middle and ring finger of the physician gently were touched the skin over the radial artery of the subject. The index finger was comfortably placed one inch below from the wrist crease and the other two fingers placed next to it (the thumb should not be extended too far nor too much

fixed). The physician pressed and loose his three fingers simultaneously and was concentrated every finger separately to observed *Vatha, Piththa and Kabha naadi*. Left and right hand (*Kai*) were used to assess the *naadi* for female and male respectively (Shanmugavelu, 1967).

4.4.5 *Manikkadai*

Manikkadai was measured as the circumference of the forearm above four finger breath from the wrist using a thread. There after the length of the circumference measured using the four fingers of the patient except thumb.

4.5 Ethical clearance

The ethical clearance was received from the Ethical Review Committee of GSMC, Palayamkottai, Tirunelveli, Tamil Nadu, India (Annexure V, pp No. 126) for using human subjects. The study procedure was explained in detail and written informed consent was obtained from all the subjects before the commencement of the study (Annexure I, pp No. 98). Each patient was provided with a leaflet which included the diet chart for NR (Annexue III, pp No. 107). Results of Siddha diagnostic and biochemical analyses were given to the patients individually. All data of the subjects were kept confidentially.

4.6 Questionnaires

4.6.1 Types of questionnaire

The questionnaire case report form I was used to assess the inclusion and exclusion criteria to selecte the patient for the study in the first vist (Annexure IV, pp No. 116).

Another general questionnaire case report form II was used to take history, physical and systemic examination of the selected patients according to above questionnaire (Annexure IV, pp No.118).

Laboratory investigation were recorded in case report form III (Annexure IV, pp No. 121).

Case report form IV was used to assess the prognosis (laboratory investigation) in subsequent visits during the treatment. (Annexure IV, pp No. 125)

CHAPER 5

RESULTS

5.1 Diagnosis of NR

5.1.1 The sign and symptoms of the patients

The mean age of the study population was 45 ± 15 (mean ± standard deviation (SD)) years. The common sign and symptoms of the patients who have been selected for the study has shown in the Table 5.1. High percentage of the patients had weight loss (85 %) and excessive urination (78.8 %).

Table 5.1. The common sign and symptoms observed in patients attending to the out and in patient department at first time – OPD and IPD at GSMC, Palayamkottai, GDHH, Thoothukudi and GSV, Tirunelveli (n=60)

Signs and symptoms	n	(%)
Excessive urination (polyuria)	47	(78.8)
Excessive hunger (polyphagia)	26	(43.0)
Excessive thirst (polydipsia)	26	(43.0)
Tiredness/exhaustion	40	(66.6)
Changes of body weight (weight loss)	51	(85.0)
Body ache	19	(31.7)
Giddiness	23	(38.3)
Numbness/ tingling (polyneuritis)	19	(31.7)

n – Number of patients

5.1.2 Assessment of biochemical parameters of the blood samples (modern aspect) of the patients attending to the OPD and IPD at first time - GSMC, Palayamkottai, GDHH,Thoothukudi and GSV, Tirunelveli (n=60)

Table 5.2 has shown the mean FBS was 280.7 ± 145.5 mg/dL in 51 patients. Nearly 31% of the patients had higher than the mean concentration of FBS (>281.0 mg/dL) at first visit. The mean concentration of PPBS was 274.6 ± 73.7 mg/dL in 09 patients. Nearly 66.7% of the patients had higher than the mean concentration of PPBS (>275.0 mg/dL). None of the patient showed positive indication of serum creatinine, SGOT and SGPT at first visit.

Table 5.2. Assessment of the biochemical parameters of the blood samples (modern aspect) of patients (n=60)

Biochemical parameter	**Result**	**n**	**%**
Fasting blood sugar, mg/dL *(mean ± SD)*	280.7 ± 145.5		
> 281.0 mg/dL		16	(31.4)
Post prandial blood sugar* (mg/dL) *(mean ± SD)*	274.6 ± 73.7		
< 275.0 mg/dL		03	(33.3)
Serum creatinine mg/ dL	Negative	60	(100)
Serum glutamic-oxaloacetic transaminase (SGOT) U/L	Negative	60	(100)
Serum glutamic pyruvic transaminase (SGPT) U/L	Negative	60	(100)

* Data available for n = 9 patient and and n – Number of patients

5.1.3 Assessment of biochemical parameters of the urine samples (modern aspect) of the patients attending at baseline – OPD and IPD at GSMC, Palayamkottai, GDHH, Thoothukudi and GSV, Tirunelveli (n=60)

A higher percentage (81.7%) of patients's urine samples had an acidic pH of 5.0 and pH 6.0 was noted in 11. 7% of urine samples (Table 5.3). A high percentage (65 %) of patients had higher specific gravity (1.030) in their urine. Increased urine glucose (++++ or ≥ 2000 mg/dL) was noted in 15 % of patients. Urine protein was negative in 70 % of the patients. Negative indication for urine ketones, urobilinogen, bile pigments, nitrate, leucocytes and blood were noted in all patients.

Table 5.3. Biochemical parameters (modern aspect)) of the patient's urine samples (n=60)

Biochemical parameters of the urine samples	No. of samples (n)	%
pH		
5.0	49	81.7
6.0	7	11.7
6.5	2	3.3
7.0	2	3.3
Specific gravity		
1.010	5	8.3
1.015	2	3.3
1.020	12	20
1.025	2	3.3
1.030	39	65
Urine sugar		
Negative	2	3.3
+ (250 ± 15 mg/dL)	18	30
++ (500 ± 30 mg/dL)	14	23.3
+++ (1000 ± 60 mg/dL)	17	28.3
++++ (2000 ±110 mg/dL)	9	15
Urine protein		
Negative	47	70
Trace (15 ± 0.15 mg/dL)	07	11.7
+ (30 ± 0.3 mg/dL)	07	11.7
++ (100 ± 1.0 mg/dL)	04	6.7
Ketones		
Negative	60	100

Table 5.3 continue… Biochemical parameters (modern aspect)) of the patient's urine samples (n=60)

Biochemical parameters of the urine samples	No. of samples (n)	%
Urobilinogen		
Negative	60	100
Bile pigments		
Negative	60	100
Nitrates		
Negative	60	100
Leucocytes		
Negative	60	100
Blood		
Negative	60	100

5.1.4 Factors associating with concentration of blood sugar

Figure 5.1 has shown that the patient diagnosed with higher urine glucose (++++ or ≥ 2000 mg/dL) had significantly ($F_{4, 46} = 6.6111$, $p<0.001$) higher fasting blood sugar (446.8 ± 262.5 mg/dL; mean ±SD) than the patient diagnosed with negative urine glucose (< 100 ± 5.0 mg/dL)

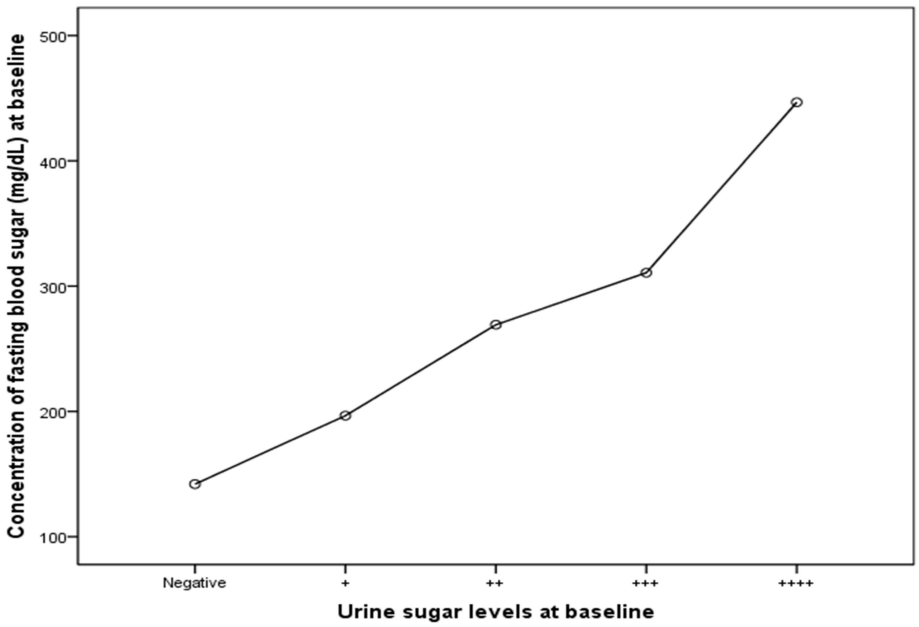

Fig. 5.1. The association of fasting blood sugar and urine Glucose level

Neither significant association nor correlation was observed between blood sugar and urine pH and specific gravity.

5.1.5 Examination of urine by *neerkuri* (Siddha aspect)

Neerkuri was assessed by analysing the colour, odour, froth and the sedimentation of the urine samples collected form the patients. Figure 5.2 has shown the colours and froth appeared in the tested urine samples.

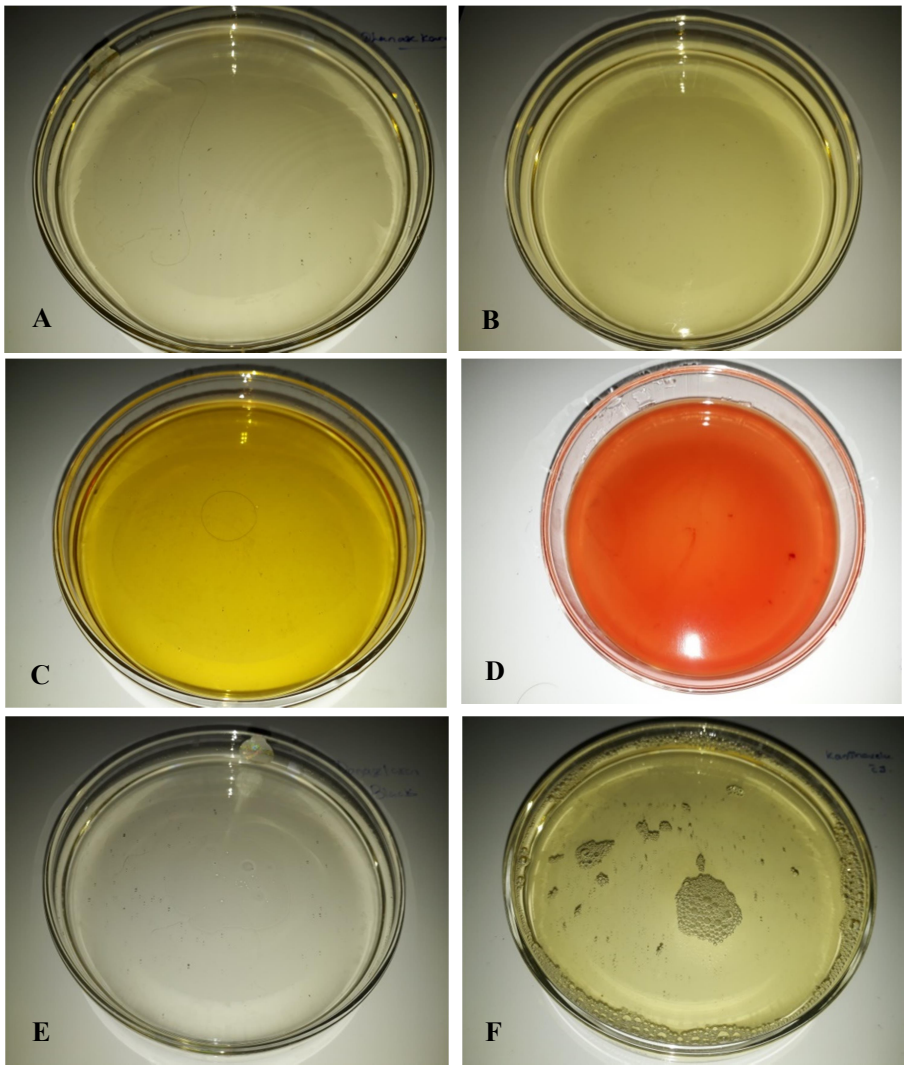

Fig. 5. 2. Morphological description (colours and froth) of neerkuri; A- *Seerana apakkuva neer* (colour of wet straw water), B- *Seeran pakkuva neer* (colour of *Citrus medica* fruit), C- *Soottai tharakkoodiya neer* (colour of *Atalandia monophylla* fruit), D- *Athiuttina neer* (colour of flame), E- *Suththa seethala neer* (Clear urine) and F- Froth appear in the urine

Table 5.4 described that the *seerana apakkuva neer* (wet straw water colour) was observed in 51.7 % of patients and 11.7% of patients had *suththa seethala neer* (clear urine). Odour and froth in urine noted in 13.3% and 11.7% of the patients respectively. Sedimentation was observed in 3.3 % of the patient's urine.

Table 5.4. Examination of *neerkuri* (Siddha aspect of urine examination) in the patients at baseline (n=60)

Characteristics of the urine samples	**No. of patients (n)**	**(%)**
Colour of the urine		
Seerana apakkuva neer (colour of wet straw water)	31	51.7
Seerana pakkuva neer (colour of *Citrus medica*. L fruit)	12	20
Soottai tharakkoodiya neer (colour of *Atalandia monophylla* (Roxb.) A.DC. fruit)	08	13.3
Athiuttina neer (colour of flame)	02	3.3
Suththa seethala neer (clear urine)	07	11.7
Froth		
Urine samples with froth	07	11.7
Urine samples without froth	53	88.3
Sedimentation		
Urine samples with sedimentation	02	3.3
Urine samples without sedimentation	58	96.67
Odour		
Urine samples with odour	08	13.3
Urine samples without odour	52	86.7

5.1.6 Examination of urine by *neikuri* (oil drop test (Siddha aspect)

5.1.6.1 Shape of the *neikuri*

Irregular pattern and round shape was observed in the *neikuri* (Figure 5.3).

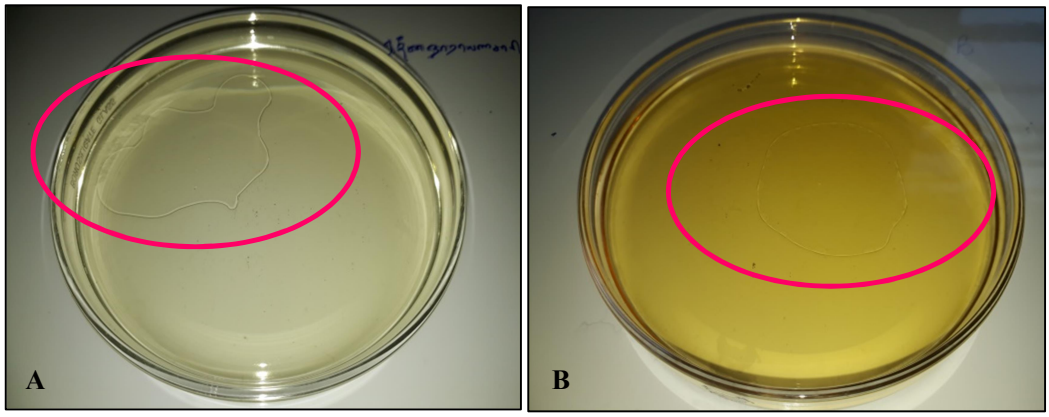

Fig. 5.3. Shape of the *neikuri*; A- Irregular shape and B- round shape

The fasting blood sugar was compared with the shape of the *neikuri* in urine samples tested (Table 5.5). The patients with irregular shape of *neikuri* in their urine samples have shown a slightly higher concentration of fasting blood sugar (291.1 ± 154.3mg/dL) than the patients with round shape of *neikuri* ($F_{1, 46} = 1.408$, p=0.241). None of the patient have developed a pearl shape in their urine samples.

Table 5.5. Shape of the *neikuri* in urine samples and fasting blood sugar at baseline (n=51)

Shape of the neikuri	**No. of patients (n)**	**Concentration of fasting blood sugar (mg/dL) (Mean ± SD)**
Irregular	43	291.1 ± 154.3
Round	08	224. 9 ± 63.8

5.1.6.2 Duration for testing the *neikuri* and the biochemical parameters of the urine samples

The time taken to start and disappear the scatter of *neikuri* was 161.4 ± 158.9 seconds (2.7 ± 2.6 minutes) and 771.8 ± 483.9 seconds (12.9 ± 8.1 minutes) respectively.

The patients with low concentration of glucose (negative) in their urine have taken a lessened time as 101.5 ± 0.7 seconds (1.7 ± 0.01 minutes) to start the scatter of *neikuri* (Table 5.6). The patients with moderately high concentration of glucose (++ (500 ± 30 mg/dL) in urine, have taken more time to start the scatter of *neikuri* (206.7 ± 147.9 seconds). Neither significant association significantly ($F_{1, 58}$ = 0.404, p=0.528) nor correlation was observed between the level of concentration of urine glucose with the time taken to start to scatter of *neikuri*. When considering the time taken to disappear the scatter of *neikuri*, the time was significantly increased with the increase of glucose levels in the urine samples.

Comparatively a lessened time was observed to start (62.5 ± 3.5 seconds) and disappear (780.0 ± 1.2 seconds) the scatter of *neikuri* with the urine pH 7 (Table 5.6). The urine samples with pH 6.5 have taken more time to start the scatter of *neikuri* and the samples with pH 6 have taken a higher time to disappear the scatter of *neikuri*.

The urine samples with higher specific gravity (1.03) have taken more time to start the scatter of *neikuri* (187.5 ± 177.6 seconds) and taken lessened time to disappear the scatter of *neikuri* (639.1 ± 237.1 seconds). While, the samples with lower specific gravity (1.01) have taken lessened time to start the scatter (64.0 ± 9.1 seconds) and more time to disappear the scatter of *neikuri* (1361.2 ± 492.0 seconds) (Table 5.6). Further the time taken to start the scatter of *neikuri* was increased with the increase of specific gravity significantly ($F_{4, 55}$ = 0.926, p=0.456), even though a significant ($F_{4, 55}$ = 3.436, p=0.014) reduction was noted in the time of disappearing the scatter of *neikuri* with the increase of specific gravity of urine samples.

Table 5.6. Comparison of the time taken to start and disappear the scatter of *neikuri* and biochemical parameters of the urine samples at baseline (n=60)

Biochemical parameters	**Number of patients (n)**	**Time taken start to scatter of *neikuri* (seconds)** Mean ± SD	**Time taken to disappear the scatter of *neikuri* (seconds)** Mean ± SD
Urine sugar level			
Negative	2	101.5 ± 0.7	823.5 ± 0.7
+	18	188.6 ± 219.2	249.8 ± 249.8
++	14	206.7 ± 147.9	735.9 ± 291.8
+++	17	106.5 ± 39.5	848.5 ± 489.4
++++	9	153.3 ± 143.2	1124.1 ± 885.9
pH of urine			
5	49	169.4 ± 166.7	639.0 ± 253.6
6	7	76.3 ± 22.3	1160.0 ± 528.6
6.5	2	2660.5 ± 0.7	735.9 ± 291.8
7	2	62.5 ± 3.5	780.0 ± 1.2
Specific gravity of urine			
1.010	5	64.0 ± 9.1	1361.2 ± 491.9
1.015	2	101.5 ± 0.7	823.5 ± 0.7
1.020	12	129.2 ± 134.0	935.1 ± 850.2
1.025	2	148.0 ± 0.0	855.0 ± 0.0
1.030	39	187.5 ± 177.6	639.1 ± 237.1

5.1.6.3 Shape of the *neikuri* and the biochemical parameters of the urine samples

Table 5.7. Number of patients with different shapes of *neikuri* and their biochemical properties of urine samples (n=60)

Biochemical parameters	No. of patients with different shape of neikuri			
	Irregular (n=52)		Round (n=08)	
	n	(%)	n	(%)
Urine sugar level				
Negative	0	0	2	25
+	18	34.6	0	0
++	11	21.1	3	37.5
+++	15	28.8	2	25
++++	8	15.4	1	12.5
pH of urine				
5	43	82.7	6	75
6	06	11.5	1	12.5
6.5	01	1.9	1	12.5
7	02	3.8	0	0
Specific gravity of urine				
1.010	4	7.7	1	12.5
1.015	0	0	2	25
1.020	11	21.2	1	12.5
1.025	2	3.8	0	0
1.030	35	67.3	4	50

n – Number of patients

Table 5.7 has shown, a higher percentage (86.7%) of patients had irregular shape of *neikuri*. Among the patients with irregular shape of *neikuri*, 18 patients presented with the urine glucose level + (250 ± 15 mg/dL) and 15 patients presented with +++ (1000 ± 60 mg/dL). High specific gravity (1.030) of urine has observed in 67.3 % of urine samples and acidic urine (pH 5) has noted in 82.7 % of urine samples in irregular *neikuri* pattern of urine.

5.1.7 *Naadi*

The concentration of blood sugar was compared with the *naadi* of the patients (Table 5.8). The patients with *Kabhavatha naadi* had a significantly ($F_{3, 47} = 3.513$, $p = 0.022$) higher concentration of FBS (423.7 ± 289.5 mg/dL) than the patients with *Vathakabha naadi* (FBS 178.8 ± 56.3 mg/dL), *Piththavatha naadi* (FBS 263. 3 ± 104.3 mg/dL) and *Vathapiththa naadi* (FBS 268.1 ± 88.4 mg/dL). The patients with *Vathakabha naadi* had comparatively lower FBS (178.8 ± 56.3 mg/dL) than the other patients.

Table 5.8. Concentrations of fasting blood sugar and *naadi* at base line (n=51)

Naadi	**Number of patients**	**FBS (mg/dL) (mean ± SD)**
Vathakabham	04	178.8 ± 56.3
Piththavatham	19	263. 3 ± 104.3
Vathapiththam	21	268.1 ± 88.4
Kabhavatham	07	423.7 ± 289.5

5.1.7.1 Correlation of *neikuri* with the diagnosis of *naadi* (n=60)

The correlation of *neikuri* and *naadi* were analysed for confirm the diagnosis (Table 5.9). Among the 25 patients having *Vathapiththam* (diagnosed by *naadi*) 21 patients (84%) were correctly classified to have *Vathapiththam* by the method of *neikuri*. All of the *Piththavatha* patients (diagnosed by *naadi*) were correctly classified by *neikuri*. Further, 75% of *Kabhavatham* and *Vadhakabham* patients were correctly classified.This finding indicated the correlation between *naadi* and *neikuri*.

Table 5.9. Correlation of *neikuri* with the diagnosis of *naadi* at baseline (n=60)

Naadi	**No. of patients diagnosed by *naadi***	**% of patients correctly diagnosed by *neikuri***	**% of patients miss diagnosed by *neikuri***
Vathapiththam	25	84	16
Piththavatham	23	100	00
Kabhavatham	08	75	25
Vathakabham	04	75	25

5.1.8 *Manikkadai*

Nearly 54.9% (n=28) of the study population was recorded with $8^1/_4$ *manikkadai* at baseline.

Table 5.10. Concentration of fasting blood sugar and *manikkadai* at baseline

Manikkadai	**n**	**%**
7 ¼	01	1.9
7 ½	01	1.9
7 ¾	02	3.9
8	07	13.7
8 ¼	28	54.9
8 ½	03	5.9
8 ¾	-	-
9	03	5.9
9 ¼	-	-
9 ½	03	5.9
9 ¾	01	1.9
10	01	1.9
10 ¼	01	1.9

n – Number of patients

5.2 Prognosis

5.2.1 The changes of the common sign and symptoms observed at baseline, after the treatment with *Madhumega chooranam*.

The common sign and symptoms of the patients presented at baseline and end of the study has shown in the Table 5.11. The percentage of patients having polyuria, polyphagia, polydipsia, tiredness/exhaustion, weight loss, giddiness and numbness/tingling reduced from the baseline to seventh visits following the treatment of *Madhumega chooranam*. However, no change was observed in the visual disturbance after the treatment of *Madhumega chooranam*.

Table 5.11. Comparison of common sign and symptoms of the patient following the treatment of *Madhumega chooranam* (n=60)

	Number of patients having the signs/ symptoms (%)						
Signs and symptoms	**Baseline**	**Second visit**	**Third visit**	**Fourth visit**	**Fifth visit**	**Sixth visit**	**Seventh visit**
Excessive urination (polyuria)	78.8	58.3	53.3	41.7	25.0	16.7	13.3
Excessive hunger (polyphagia)	43.3	33.3	26.7	20	16.7	16.7	16.7
Excessive thirst (polydipsia)	43.3	25	21.6	16.6	13.3	10.0	8.3
Tiredness/exhaustion	66.6	43.3	33.3	31.3	28.3	13.3	8.3
Changes in body weight (weight loss)	85.0	20.0	20.0	18.3	16.6	13.3	10.0
Body ache	31.7	26.7	25.0	25.0	23.3	26.7	21.6
Giddiness	38.3	26.7	20.0	11.7	8.3	5.0	5.0
Numbness/ tingling (polyneuritis)	31.7	30.0	30.0	26.7	18.3	15.0	13.3

5.2.2 Changes of FBS following the treatment of *Madhumega chooranam*

Effect of *Madhumega chooranam* on concentration of blood sugar was shown in figure 5.4. The FBS was significantly ($p < 0.001$) reduced from the baseline (288.0 ± 162.3 mg/L) to seventh visit (167.2 ± 78.7 mg/dL) following the treatment of *Madhumega chooranam*.

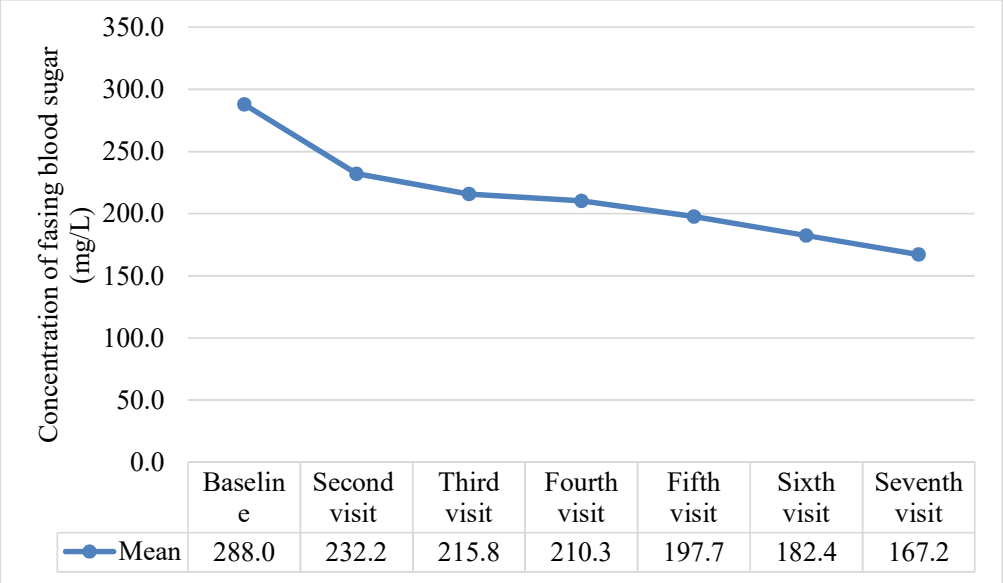

Fig. 5.4. Concentration of FBS following the treatment of *Madhumega chooranam*

5.2.3 Changes of the biochemical parameters of urine sample with the treatment of *Madhumega chooranam*

A higher percentage of patient's urine samples had an acidic pH of 5.0 at baseline to seventh visit (Table 5.12). A high percentage of patients had higher specific gravity (1.030) in their urine samples throughout the visit. A substantial reduced was observed in concentration of urine glucose. Approximately 67% of patients had low urine glucose (indicated as negative in the urine strips). Similarly, the percentage of low protein (indicated as negative) was increased from baseline (70%) to seventh visit (91.7%).

Table 5.12. Changes of the biochemical parameters of the urine sample with the treatment of *Madhumega chooranam* (n=60)

Biochemical parameters of the urine samples	Number of patients having the signs/ symptoms (%)						
	Baseline	**Second visit**	**Third visit**	**Fourth visit**	**Fifth visit**	**Sixth visit**	**Seventh visit**
pH							
5.0	81.7	78.3	75.0	81.7	76.7	78.3	71.7
6.0	11.7	15.0	21.7	11.7	16.7	18.3	18.3
6.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3
7.0	3.3	3.3	-	3.3	3.3	-	6.7
Specific gravity							
1.005	-	3.3	5.0	5.0	8.3	8.3	11.7
1.010	8.3	3.3	3.3	3.3	6.7	6.7	3.3
1.015	3.3	8.3	11.7	15.0	5.0	8.3	13.3
1.020	20.0	10.0	6.7	5.0	11.7	8.3	8.3
1.025	3.3	1.7	13.3	6.7	11.7	-	10.0
1.030	65.0	73.3	60.0	65.0	56.7	68.3	53.3
Urine sugar							
Negative	3.3	26.7	23.3	23.3	45.0	56.7	66.7
+	30.0	21.7	16.7	31.7	13.3	10.0	3.3
++	23.3	20.0	25.0	20.0	21.7	13.3	8.3
+++	28.3	21.7	20.0	8.3	-	-	3.3
++++	15.0	10.0	15.0	16.7	20.0	20.0	18.3
Urine protein							
Negative	70.0	68.3	75.0	85.0	88.3	91.7	91.7
Trace	11.7	16.7	16.7	8.3	1.7	5.0	5.0
+	11.7	3.3	1.7	-	3.3	-	-
++	6.7	11.7	6.7	6.7	6.7	3.3	3.3

Table 5.12 has shown the urine glucose was reduced with the treatment of *Mathumega chooranam*, whereas the patients presenced with high urine glucose was not reduced. Presence of protein in urine was decreased at the 7th visit than baseline, with the

treatment. No changes were observed in the pH when following the treatment. From the baseline to seventh visit the urine samples remained with an acidic pH (range 5.2-5.4) (Figure 5.5). The specific gravity of the urine samples was fluctuated and reduced from baseline (1.026) to seventh visit (1.023) following the treatment (Figure 5.6).

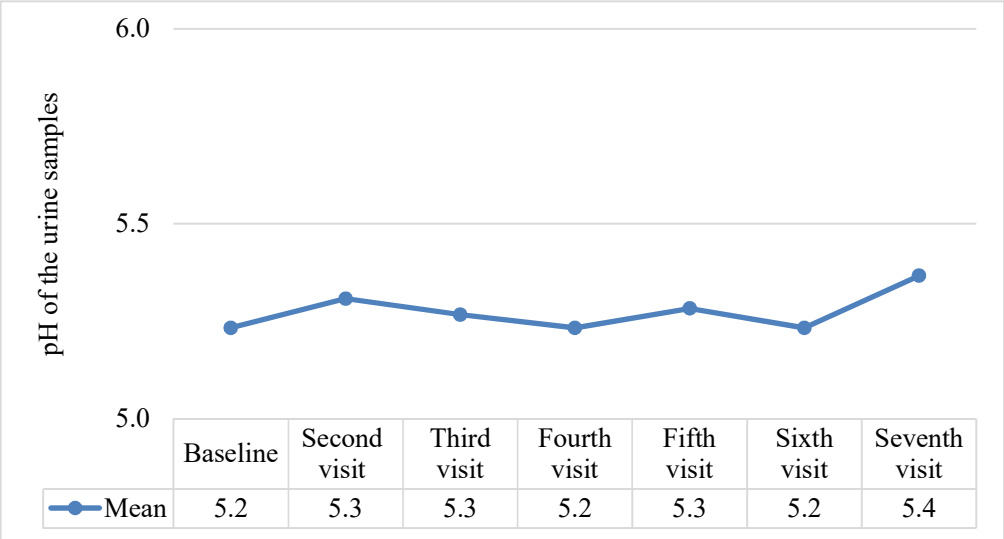

Fig. 5.5. Changes in the pH of the urine with the treatment of *Madhumega chooranam*

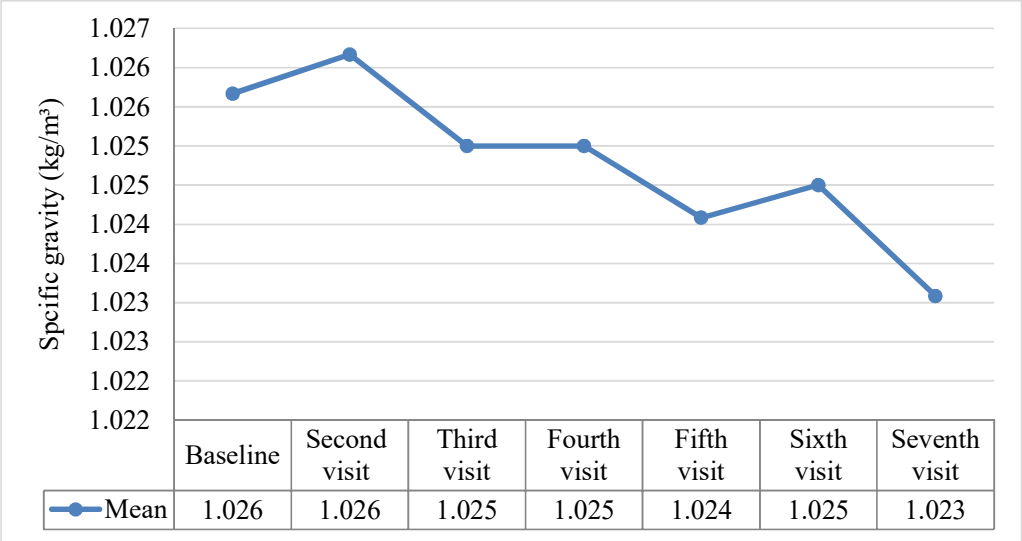

Fig. 5.6. Changes in the specific gravity of the urine with the treatment of *Madhumega chooranam*

5.2.4 Changes in the parameters of *neerkuri* with the treatment of *Madhumega chooranam*

Table 5.13 compares the parameters of *neerkuri* of urine samples from the baseline to seventh visit with the treatment of *Madhumega chooranam*. There was no notable difference observed in the colour, froth and the sedimentation of urine samples. However, the percentage of patients having odour in their urine was reduced at seventh visit (3.3%) when compared with baseline (13.3%)

Table 5.13. Changes in the parameters of *neerkuri* with the treatment of *Madhumega chooranam* (n=60)

Parameters of *Neerkuri*	**Number of patients (%)**						
	Base line	**2nd visit**	**3rd visit**	**4th visit**	**5th visit**	**6th visit**	**7th visit**
Colour of the urine							
Seerana apakkuva neer (colour of wet straw water)	51.7	55.0	56.6	55.0	55.0	55.0	46.6
Seerana pakkuva neer (colour of *Citrus medica* (Roxb.) fruit)	20.0	21.6	21.6	23.3	25.0	25.0	25.0
Soottai tharakkoodiya neer (colour of *Atalandia monophylla* L. fruit)	13.3	10.0	8.3	8.3	8.3	8.3	8.3
Athiuttina neer (colour of flame)	3.3	1.7	1.7	1.7	-	-	-
Suththa seethala neer (clear urine)	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Froth							
Froth (+)	11.7	11.7	11.7	11.7	11.7	11.7	11.7
Froth (-)	88.3	88.3	88.3	88.3	88.3	88.3	88.3
Sedimentation							
Sedimentation (+)	3.3	1.7	1.7	1.7	1.7	1.7	1.7
Sedimentation (-)	96.7	98.3	98.3	98.3	98.3	98.3	98.3
Odor							
Odor (+)	13.3	10	8.3	8.3	5.0	3.3	3.3
Odor (-)	86.7	90.0	91.7	91.7	95.0	96.7	96.7

5.2.5 Changes in the *neikuri* with the treatment of *Madhumega chooranam*

5.2.5.1 Changes in the shape

Table 5.14 represents the changes in the shapes of the *neikuri* when taking the treatment with the *Madhumega chooranam*. At baseline 52 urine samples (n=52) have shown irregular shape and 08 urine samples (n=08) have shown round shape when applied the oil drop. At the end of the study (after treatment with *Madhumega chooranam*), 39 (75%) urine samples (out of 52 irregular shapes) changed to round, 06 (11.5%) remained irregular and 07 (13.5%) samples changed to pearl shape. Whereas, the urine samples showed round shape (n=08) at the baseline, remained with round shape at the end of the study. Comparatively low FBS was observed in the patients with round shape of *neikuri* than the patients with irregular shape of *neikuri*.

Table 5.14. Changes in the shape of the *neikuri* with the treatment of *Madhumega chooranam*

Shapes of *neikuri*	**At baseline**		**At 7th visit**						**Total**	
			Irregular shape		**Round shape**		**pearl shape**			
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Irregular shape	52	86.7	6	11.5	39	75	07	13.5	52	86.7
Round shape	08	13.3			08	100			08	13.3
Total	60	100	06	10	47	78.3	07	11.7	60	100

5.2.5.2 Variations in the duration of time taken to start and disappear the scatter of *neikuri*

The Figure 5.7 has shown the variations of the mean time taken to start the scatter of *neikuri* from baseline to the seventh visit when taking the *Madhumega chooranam*. A rapid increase was observed in the time taken to start the scatter (256 seconds) at the 4th visit and there after gradually decreased at subsequent visits.

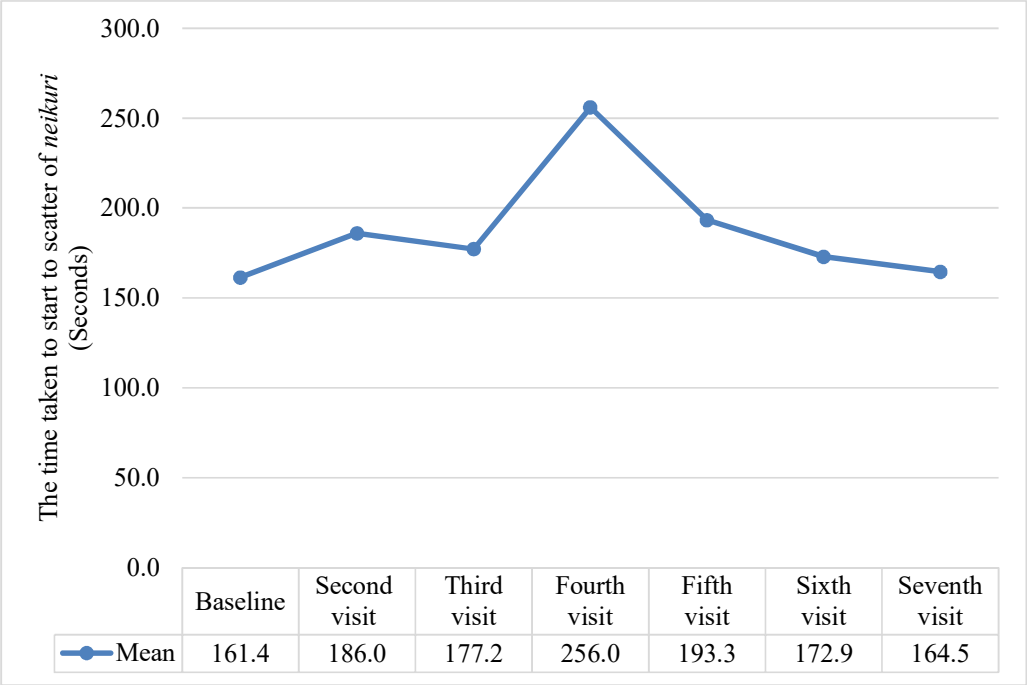

Fig. 5.7. Variations in the time taken to start to scatter of *neikuri* with the treatment of *Madhumega chooranam*

The mean total time taken to test the *neikuri* (until disappear the scatter of *neikuri*) from baseline to the seventh visit has shown in Figure 5.8. Comparatively, an increase was noted at the third visit (956.7seconds) and lowest time noted at fifth visit (642.8 seconds).

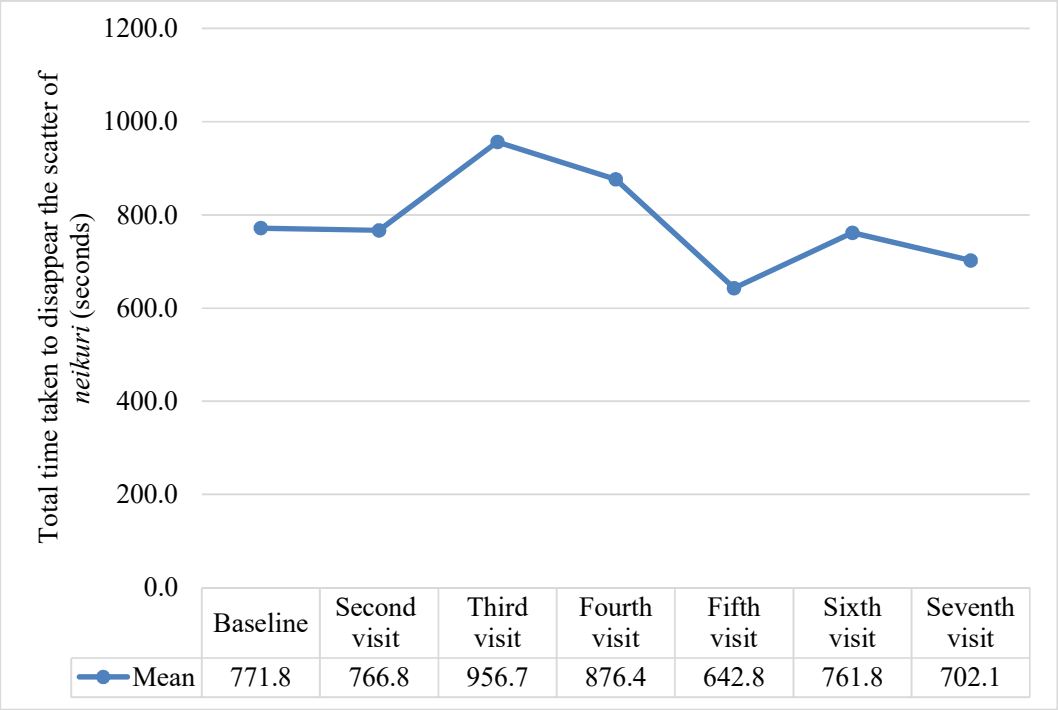

Fig. 5.8. Variations in the total time taken to disappear the scatter of *neikuri* with the treatment of *Madhumega chooranam*

5.2.6 Changes in the *naadi* with the treatment of *Madhumega chooranam*

Table 5.15 has shown the changes in *naadi* with the treatment of *Madhumega chooranam*. The patients who has presented with *Vathapiththa naadi* (25 patients (41.7%) at baseline changed to *Piththavatha naadi* (20 patients (80%) and *Kabhavatha naadi* (1 patients (04%) with the treatment of *Madhumega chooranam*. 23 patients (38.3%) presented with *Piththavatha naadi* at base line, 19 patients (82.6%) remain unchanged. The patients who has diagnosed as *Kabhavatha naadi* (08 patients (13.3%) at baseline, 6 patients (75%) remain unchanged at the 7th visit with the treatment of *Madhumega chooranam*.

Table 5.15. Changes in the *naadi* following the treatment of *Madhumega chooranam*

At baseline			**At 7th visit**							
			Naadi							
Naadi			***Vatha piththam***		***Vatha kabham***		***Piththa vatham***		***Kabha vatham***	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Vathapiththam	25	41.7	04	16.0	-		20	80.0	01	04.0
Piththavatham	23	38.3	03	13.0	01	4.3	19	82.6	-	
Kabhavatham	08	13.3	-		-		02	25.0	06	75.0
Vathakabham	04	6.7					02	50.0	02	50.0
Total	60	100	07	11.7	01	1.7	46	71.7	09	15.0

5.2.7 Correlation between fasting blood sugar and *naadi*

The concentration of FBS was compared with the *naadi* of the patients at the seventh visit (Table 5.16). The patients with *Kabhavatha naadi* had higher concentration of FBS (361.6 ± 35.5mg/dL) than the patients with *Vathapiththam naadi* (FBS 128.4 ± 3.5mg/dL) and *Piththavatha naadi* (FBS 156.7 ± 48.2mg/dL).

Table 5.16. Mean concentrations of the FBS and *naadi* at seventh visit

Naadi	**Study population (n=58)**	**Mean concentration of fasting blood sugar (mg/dL) (mean ± SD)**
Piththavatham	44	156.7 ± 48.2
Vathapiththam	7	128.4 ± 3.5
Kabhavatham	7	361.6 ± 35.5

5.2.8 *Manikkadai*

Manikkadai was significantly (p<0.05) increased from baseline visit to seventh visit with the treatment of *Madhumega chooranam* (Fig.5.9). The mean difference of the *manikkadai* in each visit was significantly (p<0.05) raised with the treatment.

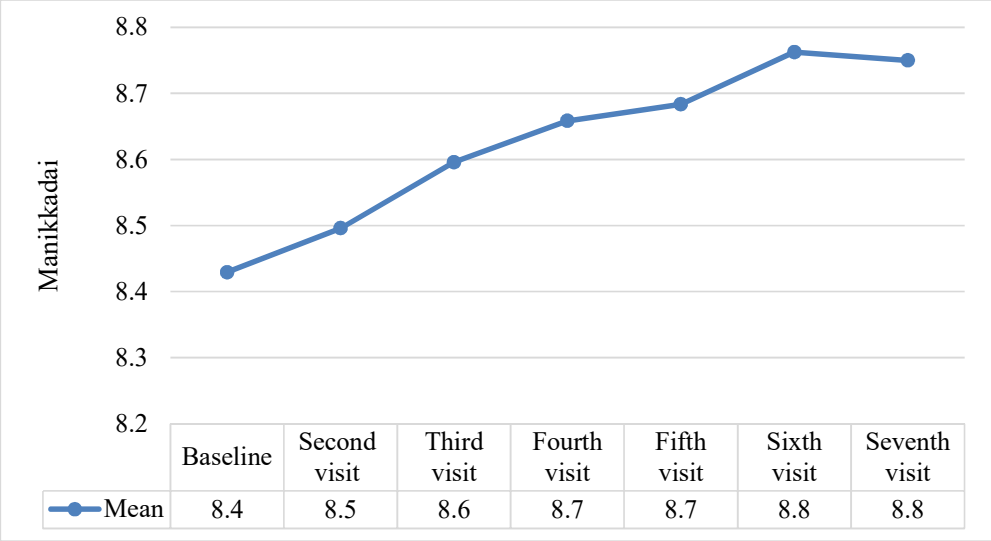

Fig. 5.9. Changes in the *manikkadai* of the patient following the treatment of *Madhumega chooranam*

CHAPTER 6

DISCUSSION

The current study documented the comparison of the Siddha diagnostic methods specially *neerkuri*, *neikuri, naadi* and *manikkadai* with modern diagnostic methods in the condition of Neerizhivu madhumeham. Specially in this study a collabration was observed between the *neikuri* and *naadi* and this collabration followed to confirm the *neikuri*. The correlation was observed between the fasting blood sugar and *naadi*. Changes were documented in *neerkuri*, *neikuri*, *naadi*, *manikkadai*, concentration of urine glucose and blood sugar between baseline and end of the study with the treatment of *Madhumega chooranam*.The sign and symptoms as polyuria, polyphagia, polydipsia, changes of body weight, tiredness, body ache, giddiness and numbness were reduced at end of the sixth week, than the baseline with the treatment of *Madhumega chooranam*.

A number of literature available for the study of comprehensive effectiveness of traditional medicine for specific disease entities (Claudia *et al*., 2013). The comparative study on Siddha diagnostic methods specially *neerkuri* and *neikuri* with modern diagnostic methods in the condition of NR, has not been thoroughly studied previously to the best of my knowledge. One previous study by Ekka Ranjita *et al* (2013) has documented the prognostic aspect of *taila bindu pariksha* in *prameha*. In this way, the current study is unique and innovative. The sign and symptoms of NR were nearly related to *mathumegam, neerizhivu* and *salamegam* in Siddha system of medicine (*Thirumoolar vaithiyam karukkadai* – 600, *Yuki vaiththiya kaviyam* and *Dhanvanthiri sootchuma vaithiyam 200 visha bethi vaiththiyam*) and DM in the system of Allopathic medicine (Habtamu, 2015). In addition, the *prameha* in Ayurveda medical system was compared with DM (Ekka Ranjita *et al.,* 2013).

The pH of the urine of majority patients was acidic (pH 5) at the baseline and end of the sixth week (at the baseline 81.7 % and at the end of the sixth week 71.7 %). There was no correlation observed in pH of the urine with blood sugar level. Diabetic acidosis, uncontrolled diabetes and fasting influences the acidic urine (Compendium

of urine analysis, 2011). The patients were present for the study at base line (85 %) and at the seventh visit (96.7 %) with fasting and it may be the reason for the acidic urine. The study indicates that, the pH of the urine cannot be taken as a parameter for confirming the NR.

There was no significant changes observed in specific gravity of urine at the base line and at the end of the study with the treatment. No correlation observed in urine specific gravity with blood sugar level in the current study. But, the compendium of urine analysis documents the specific gravity of the urine increases if the glucose concentration increase > 1000 mg/dL (>56 mmol/L) (Compendium of urine analysis, 2011). A discrepancy was noted with the study of Compendium of urine analysis and further studies wil be needed to confirm correlation. The specific gravity of the urine depends primarily on the amount of fluid intake by the patient, heavy sweating and increase urine output provoked by diuretics (Compendium of urine analysis, 2011). Excessive urination and glucose concentration in urine may be a possible reason for the high specific gravity of urine.

Urine protein was negative for 70 % of the patients, trace amount observed at 11.7 % and positive for 18.3 % of the patients at baseline. These findings indicate that, 81.7 % of patients were not aroused with renal pathology at base line and 18.3 % of patients may have silence NR for a long time. Negative urine protein level was increased at the end of the study (91.7 %) than the baseline (70 %) and the percentage of patients presented with urine protein gradually decreased with the treatment of *Madhumega chooram*. The above finding indicates the influence of the *Madhumega chooram* in renal pathology and it is an added advandage.

Correlation noted with high blood sugar level and high concentration of glucose in urine. High concentration of glucose in urine was observed in the patients, who had high blood sugar level. Correlation observed with urine glucose level and blood sugar level (Morris, McGee and Kitabchi, 1981).

Significant changes was not observed at *seerana apakkuva neer* (wet straw water colour) at the baseline (51.7 %) and at the end of the study (46.6 %) and no change observed in *Suththa seethala neer* (transparent) at the baseline and end of the study

(11.7 %). These findings indicate that NR cannot be confirmed with the colour of the urine. Even though the colour may indicate the *thodam* which affected the patient. S*eerana apakkuva neer, seeran pakkuva neer, soottai tharakkoodiya neer* and *athiuttina neer* indicate that the patient primarily affected with *Piththam* and *suththa seethala neer* indicates that the patient primarily affected with *Kabham* (Shanmugavelu, 1967). *Thirumoolar vaithiyam karukkadai* – 600 (Raththina nayakar and sons, 2010) indicates that, the principal *thodam* which cause NR is *Piththam* and *Kabham*. The colour of the urine may indicate the type of the NR once the NR already diagnosed.

11.7 % of patients had froth in their urine and the readings of the *neikuri* and *naadi* of the patients were interpreted as *Kabhavatham*. The sign and symptoms and blood sugar level of the patients, who had *Kabhavatha* NR were not changed, even after treatment. Availability of froth in urine indicates the *Kabhavatha* disease (Shanmugavelu, 1967) and the literature further the documented, the *Kabhavatha* disease cannot be curable. These finding indicated, that the disease will not be curable, if froth present in the urine of the NR patients. The odour of the urine was reduced at seventh visit (3.3%) when compared with baseline (13.3%). Eventhough the sediment of the urine was not changed.

When testing the *neikuri*, irregular pattern and round shape of *neikuri* was observed in 86.7 % and 13.3 % of the patients at the baseline respectively. At the end of the seventh visit 10 % of irregular, 78.3 % of round and 11.7 % pearl shape were documented. Irregular, round and pearl shapes of the *neikuri* indicates *Vatham*, *Piththam* and *Kabham* respectively (Shanmugavelu, 1967). The affected *thodam* (*Vathapiththa*, *Piththavatha, Vathakabha* and *Kabhavatha* NR) can be identified using the shape of the *neikuri* (formation of pattern) considering together with the total time taken to test *neikuri*, once the NR already confirmed by other diagnostic methods. The blood sugar level of the *Vathapiththa* and *Piththavatha* patients were less when compare with the blood sugar of *Kabhavatha* patients. The text book indicates that the *Kabhavatha* disorders are not curable (Shanmugavelu, 1967). Current study indicating that, irregular shape of *neikuri* at baseline (86.7 %) changed to round shape (75 %) at the end of the study with the treatment of *Madhumega chooranam*. In addition, blood sugar of the NR patients with round shape of *neikuri* comparatively less than the blood

sugar of NR patients with irregular shape of *neikuri*. These finding indicating *neikuri* can be used to test the prognosis of NR.

The *Yuki vaithiya kaviyam* (2002) indicates the round shape of *neikuri* in *neerizhivu* is not curable. It may indicate the *neerizhivu* can not be curable, but can manage with suitable medicines.

Clean and dry utensil need to use to test *neikuri*. False results was observed when examine the *neikuri* without washing the utensil. It is preferable to use clean separate vessels to collect the urine from the patients and transfer the urine into test utensil when conducting the test. These procedures could facilitate to avoid false results.

A significant correlation was observed between *naadi* and *neikuri* in the current study and the *neikuri* was confirmed together with the *naadi*. This correlation has not been documented in previous studies.

75 % of *Kabhavatha* NR detected (by *naadi*) at the base line did not change at the end of the study, whereas 80 % *Vathapiththa* NR was changed to *Piththavatham* and 82.6 % of *Piththavatha* NR remains as *Piththavatha* NR. The blood sugar of *Vathapiththa* and *Piththavatha* NR patients reduced with the treatment of *Madhumega chooram* indicating the *Vathapiththa* and *Piththavatha* NR can be managed with *Madhumega chooranam*.

Pendulum movement of *naadi* was felt in all NR patients in the current study. *Naadi vaagadam* (Sourirajan, 2014) describes the nature of the pendulum movement like as the beat of the Veena string in the condition of *Piththavatha* disorders. Similar moment was observed in the current study in the condition of NR. Further our study documented that, the pendulum movement does not change even the blood sugar return to normal level in the NR patients.

Four types of NR as *Vathapiththam, Piththavatham, Vathakabham* and *Kabhavatham* were noted according to *naadi* in the current study. Even though Ramachandran (2000) classified 24 types of *neerizhivu* under 7 catogary. In addition the current study documented, the range of blood sugar could be detected from the *naadi*. Relatively

low blood sugar level was observed in *Vathapiththa* and *Piththavatha* NR patients than the *Kabhavatha* NR patients. The current study indicates that the *naadi* could be used as diagnostic as well as prognostic parameter for NR.

Manikkadai nool (circumference of wrist) is one of the diagnostic and prognostic parameter which gives the progress of the disease by calculating the number of fingers in decreasing or increasing order (Susila *et al*, 2014). Usually the length of the thread starts with four finger breadth and ends with eleven finger breadth (*Panthinen Siddhar arulichcheitha nadi sasthiram*, 2012) and the low value indicates the poor prognosis of a disease (Susila *et al*, 2014). Previous studies documented the importance of wrist circumference with respect to the DM (Capizzi, 2011; Younes *et al*., 2013; Adina Mitrea, 2013). In the current study, the *manikkadai nool* was 8 ¼ finger breadth in 54.9% of the patients at baseline and it increased at the end of the six week with the reduction of blood sugar level. These finding indicates the *manikkadai nool* could be used as a parameter to analyse the prognosis of the NR. *Panthinen Siddhar arulichcheitha naadi sasthiram* (Kanthasami Muthaliyar, 2012) documents that 8 ¼ finger of *manikkadai nool* was the sign of *Piththa* disorders, fever, *bramiyam*, *kamiyam* and diseases in the head. The *Thirumoolar vaiththiyam* (*karukkadai* 600) (Raththina nayakar and sons, 2010) explains, that when the *Piththam* increase, the increased *Piththam* combine with *Vatham* and it causes the NR.

The current study indicating urine glucose, pH and specific gravity may influene in the sparding and formation of the shape of *neikuri*. There may a number of factors including surface tension, molecular weight and polarity of the molecules in the urine may influence the *neikuri*.

CHAPTER 7

SUMMARY

Neerizhivu madhumeham (NR) is a disease documented in *Thirumoolar vaithiyam* (*karukadai* 600). The sign and symptoms of NR were nearly related to *mathumegam, neerizhivu* and *salamegam* in Siddha system of medicine, *prameha* in Ayurveda system of medicine and diabetes mellitus (DM) in Allopathic system of medicine. Different diagnostic methods have been practicing to diagnosis the diseases throughout the world. Siddha system of medicine has unique assessment methods as *envagaithervu*, *neerkuri*, *neikuri* and *manikkadai* to diagnose and assume prognosis of the diseases. Even though lack of user friendly technologies and little practice of Siddha diagnostic methods have led to non-familiar of these diagnostic methods among the medical, health care and scientific communities. A little brief previous studies documented in the condition of DM using Siddha diagnostic methods. Diagnosis and evaluvate the prognosis of NR using Siddha diagnostic methods and comparative study of Siddha and Alopathy diagnostic methods on NR has not been studied previously. It is essential to give a scientific validation for Siddha diagnostic methods in the condition of NR to the effective reuse of Siddha diagnostic methods in clinical practice. Therefore the current study was design to test the interactions between the NR and Siddha diagnostic methods specially *neerkuri*, *neikuri*, *naadi* and *manikkadai* and compare it with modern diagnostic methods of DM.

Sixty patients were randomly selected from OPD and IPD with the age of 18-64 years at Government Siddha Medical College, Palayamkottai, Tirunelveli, Government District Headquarters Hospital, Thoothukudi and Gopalasamudram village according to the inclusive and exclusive criteria. The patients were investigated using to the Siddha and modern diagnostic methods in their baseline to seventh visit and treated with *Madhumega chooranam.*

There was no correlation observed in pH of the urine with blood sugar level and the study indicates that, the pH cannot be taken as a parameter for confirming the NR. No significant changes observed in specific gravity of urine at the base line and at the end

of the study with the treatment and no correlation observed in specific gravity with blood sugar level. Urine protein level was decreased with the treatment of *Madhumega chooram* and it is an added advandage in condition of NR. Because generally chronic NR may affect the renal fuction and cause diabetic nephropathy.

Correlation noted with high blood sugar level and high concentration of glucose in urine.

Current study indicated that NR cannot confirmed with the colour of the urine. Even though the colour of the urine may indicate the type of the NR (the *thodam* which affected) once the NR already diagnosed.

The study documented that the froth appear in urine of *Kabhavatha* NR patients and the sign and symptoms and blood sugar level of the *Kabhavatha* NR patients were not changed, even after the treatment. These indicating, that the disease will not be manage, if froth present in the urine of the NR patients.

The affected *thodam* could be detectable, using the shape of the *neikuri* and the time taken to test the *neikuri*, once the NR already confirmed by other diagnostic methods. The blood sugar level of the *Vathapiththa* and *Piththavatha* patients were less when compare with the blood sugar of *Kabhavatha* patients. In addition, blood sugar of the NR patients with round shape of *neikuri* comparatively low than the blood sugar of NR patients with irregular shape of *neikuri*. These finding indicating *neikuri* can be used to test the prognosis of NR.

A significant correlation was observed between *naadi* and *neikuri* in the current study and this correlation has not been documented in previous studies. *Vathapiththa* and *Piththavatha* NR can be managed with *Madhumega chooranam*, eventhugh *Kabhavatha* NR could not manage with *Madhumega chooranam*. Pendulum movement of *naadi* was felt in all NR patients in the current study. Further our study documented that, the pendulum movement does not change even the blood sugar return to normal level in the NR patients. These finding may indicate that NR not a curable disease.

Four types of *naadi* as *Vathapiththa*, *Piththavatha*, *Vathakabha* and *Kabhavatha* NR patients were observed in the current study. In addition the current study documented, the range of blood sugar could be detected from the reading of *naadi* and the *naadi* could be used as diagnostic as well as prognostic parameter for NR. The finding indicates the *manikkadai nool* could be used as a parameter to analyse the prognosis of the NR.

Siddha diagnostic methods can be use to diagnose and assume the prognosis of NR. Any how, further elaborated study will be needed to get insights of Siddha diagnostic methods.

CHAPTER 8

CONCLUSION

The current study suggests the Siddha diagnostic method of *neerkuri* and *neikuri* help to assess health states of *Neerizhivu madhumeha* patients. In addition it can be used to findout the type of NR based on *Vatha*, *Piththa* and *Kabham*. Even though the *naadi* may serve as a diagnostic method for *Neerizhivu madhumeham*, as specially pendulum movement of *naadi* has observed in *Neerizhivu madhumeha* patients. *Neerkuri*, *neikuri*, *naadi* and *manikkadai* may be used to assess the prognosis of the *Neerizhivu madhumeham*. In conclusion, above Siddha investigative methods can be used as a diagnostic and prognostic parameter instead of modern method, in the condition of *Neerizhivu madhumeham*. However further detail studies will be needed prior to use these methods in clinical practice.

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CONSENT FORM

COMPARATIVE STUDY OF THE SIDDHA DIAGNOSTIC METHODS SPECIALLY *NEERKURI & NEIKURI* WITH MODERN DIAGNOSTIC METHODS IN *NEERIZHIVU MADHUMEHAM* (DIABETES MELLITUS – TYPE 2)

CONSENT FORM

CERTIFICATE BY INVESTIGATOR

I certify that I have disclosed all details about the study in the terms easily understood by the patient.

Date: …… Signature of the Investigator: ……

Name of Investigator: Dr. K. Vidya dharshini

CONSENT BY SUBJECT

I (Mr./Ms./Mrs) ...……

Residing at ……...…….....

agree and exercising my free power of choice, hereby give my consent to be included as a subject in the study of COMPARATIVE STUDY OF THE SIDDHA DIAGNOSTIC METHODS SPECIALLY *NEERKURI & NEIKURI* WITH MODERN DIAGNOSTIC METHODS IN *NEERIZHIVU MADHUMEHAM* (DIABETES MELLITUS), which is to be conducted at Government Siddha Medical College, Palayamkottai, Tamil Nadu.

1 have been informed to my satisfaction, by the attending physician about the purpose of the study, screening, nature of drug treatment and follow-up including the laboratory investigations to be performed to evaluate diagnostic methods and safe guard my body functions.

I am also aware of my right to opt out of the trial at any time during the course of the study without having to give the reasons for doing so.

I am giving the consent to participate to the study with my full consciousness after study the patient information sheet which given to me by the investigator and after full clarification of all my doubts. Further I state that the consent is not given under any influence or any other measures.

Name of the Subject: …….

Signature/Thumb impression: ……

Place: ……..

Date: ……

Name of witness: ……

Signature or Thumb impression: …….....

Date: ……..

Signature of investigating medical officer: …….....

Date: ……

Signature of Director in charge / Supervisor: ……

Date: ……

COMPARATIVE STUDY OF THE SIDDHA DIAGNOSTIC METHODS SPECIALLY *NEERKURI & NEIKURI* WITH MODERN DIAGNOSTIC METHODS IN *NEERIZHIVU MADHUMEHAM* (DIABETES MELLITUS)

நோயாளியின் ஒப்புதல் படிவம்

திரு/ திருமதி/ செல்வி.....(பெயர்)

ஆகிய நான் ..... (வசிக்கும் இடம்)

என் சுய நினைவுடன் பாளையங்கோட்டையில் உள்ள அரசு சித்தமருத்துவக் கல்லூரியில் நடத்தப்படும் சித்தமருத்துவ (நீரிழிவு மதுமேகம்) நோய் நிர்ணய ஆய்வுக்கு சம்மதம் அளிப்பதை தெரிவித்து எழுதிக் கொடுக்கும் ஒப்புதல் படிவம்.

மேற்படி தலைப்பைக் கொண்ட நீரிழிவு மதுமேக நோய் நிர்ணயம் சம்பந்தமான கீழ் குறிப்பிடப்பட்டுள்ள மருத்துவரினால் மேற்கொள்ளப்படும் இவ் ஆய்வுக்கு உடன் படுவதற்கு என் சுய நினைவுடன் முழு ஒப்புதலையும் தெரிவித்துக் கொள்கிறேன். இந்த ஆய்வின் நோக்கம், ஆய்வுசெய்யும் முறை, உடற் பரிசோதனை, மருத்துவம் செய்யும் முறை, தொடர் கண்காணிப்பு என்பனவற்றுடன் நோய் நிர்ணயத்தை மதிப்பிடுவதற்காகவும் எனது உடல் நலத்தை மதிப்பிடுவதற்காகவும் நடத்தப்படும் ஆய்வுகூடப் பரிசோதனைகள் பற்றிய விரிவான விளக்கம், என்னைப் பரீட்சித்து மருத்துவம் செய்யும் மருத்துவ அலுவலரினால் எனக்கு தெளிவுபடுத்தப்பட்டுள்ளது.

மேலும் இவ் ஆய்விலிருந்து எந்நேரமும் எவ்வித காரணங்களும் தெரிவிக்காது என்னால் விலக முடியும் என்பதையும் நான் நன்கு அறிவேன். இவ் ஆய்வை மேற்கொள்ளும் மருத்துவரினால் எனக்கு வழங்கப்பட்ட நோயாளர் தகவல் தாளினை முழுமையாக அறிந்து கொண்டதுடன் எனது சந்தேகங்களை முழுமையாக இவ் ஆய்வை மேற்கொள்ளும் மருத்துவரிடம் கேட்டு அறிந்து கொண்டேன். அதன் பின்னர் யாருடைய நிர்பந்தமும் இன்றி என் சொந்த விருப்புடனும் சுயநினைவுடனும் இவ் ஆய்வுக்கான ஒப்பதலைத் தெரிவித்தக் கொள்கின்றேன்.

இப்படிக்கு

பெயர்: .....
முகவரி:..... ...
திகதி: .....

நோயாளியின் கையொப்பம

சாட்சியின் பெயர்: .....
திகதி: .....
சாட்சியின் கையொப்பம் .....

ஆய்வுமருத்துவர் கையொப்பம்..... திகதி: .....

இயக்குனர்(சித்தா)- பொறுப்பு / மேற்பார்வையாளர் கையொப்பம் .....
திகதி: .....

PATIENT INFORMATION SHEET

What is the study about?

The ongoing research is to identify the suitable Siddha diagnostic method / methods to identify the *Neerizhivu Madhumeham* (NR).You are invited to participate in this study in which you will subjected to physical and systemic examination. In addition the laboratory investigation will be done. You will be investigated according to the Siddha diagnostic methods as urine examination *Neerkuri, Neikuri, Nadi* and *manikadai* and modern diagnostic methods as HbA1c/ fasting blood sugar (FBS) / post prandial blood sugar (PPBS), urine full report (UFR), serum creatinine and liver function test (SGOT and SGPT). You will be directed for the treatment with anti *Neerizhivu Madhumeham* drugs (Siddha drugs only). After commencement the treatment, you will be subjected again for the Siddha and modern investigations every week. Total 60 patients from this hospital will be taking a part in this study.

In the first visit to the hospital you will be subjected to brief screening and examination with your permission. If you eligible for the study you will be informed all the details regarding this study. After clearly understand regarding this study if you wish, with your consent you will be included in this study and signature will be gotten from you on a consent letter. Thereafter you will be subjected to a complete physical and systemic examination. In addition urine examination and laboratory investigations as described above will be done with free of charge. It will help you to assess your disease condition to treat you and help to confirm your condition of body health. Medicine will be given to you according to your condition of disease and advised to come again after a week.

From the first visit onwards, you will be required to fast overnight before attending each visit. You will be subjected for physical and systemic examination and blood and urine samples will be taken at every visit for investigations (free of charge). At each visit, you will be supplied with sufficient quantity of medicine according to your clinical condition, to last until your next visit (1 week).You will be advised to come again after a week. As this manner you will be observed for 6 weeks.

What you will have to do?

It is important that you follow the instructions carefully. You are advised to follow the consumption of diet and diet chart will be given to you. We try to keep your blood glucose level in target by make wise food choices, being physically active (exercise / yoga) (research medical officer, involved this study will advise you). You should follow life style modifications and food patterns as given along with information sheet.

The study will take approximately 6 weeks to complete. After start the treatment you are expected to visit the hospital every week to get the medicines to continue the treatment and to get the investigations.

What happens at the end of the study?

Your clinical condition will be assumed and your drug management plane will be decided. You will be advised to follow the decided drug management plan.

We may get an idea regarding suitable Siddha diagnostic method / methods to identify the *Neerizhivu Madhumeham*.

Are there any risks?

Sterile circumstance will be maintained in the examinations and laboratory investigation procedures. There is no possibility for risk. If any serious condition develop which requires urgent treatment with other drugs/therapy, you will be provide the possible medical treatment / refer you to the suitable place to manage the illness.

When you leave from the study?

Your participation in the study is entirely voluntary. If you wish you can leave from the study at any time. If you decide to leave from the study will not affect your medical care or relationship with your doctor. In the following circumstance as, your blood sugar becomes very high or very low, you start on insulin or other medication that affect blood sugar and you are taking part in any other trial your research medical officer may decide that you should not continue in the study.

What is the cost of the study?

All the tests and investigations will be done during the study will be free of charge.

What you need to do, if you are decided to take part?

You will asked to sign a consent form saying that you have been given information about the study and you voluntarily agree to take part.

It is important to follow all instructions carefully which given by your research medical officer.

நோயாளர் தகவல் தாள்

என்ன வகையான ஆய்வு மேற்கொள்ளப்படுகிறது? இதன் விபரங்கள் யாவை?

தற்போது நடைபெற்றுக் கொண்டிருக்கும் ஆய்வானது பொருத்தமான சித்த மருத்துவ நோய் அறிதல் முறை மூலம் நீரிழிவு மதுமேகம் எனும் நோயினை கண்டறிதல் ஆகும். உங்கள் அனைவரையும் இந்த ஆய்வில் பங்கேற்க அழைக்கின்றோம். அத்துடன் உங்கள் அனைவருக்கும் உடல் மற்றும் மண்டல சோதனைகள் நடத்தப்படும். இதற்கு மேலதிகமாக ஆய்வுகூட பரிசோதனைகளுக்கும் உட்படுத்தப்படுவீர்கள். சித்த நோய் அறிதல் முறைகளான சிறுநீர்ப் பரீட்சை (நீர்க்குறி, நெய்க்குறி), நாடி, மணிக்கடை என்பனவற்றுடன் நவீன ஆய்வு முறைகளான இரத்தத்தின் சீனி அளவு, சிறுநீர் முழு அறிக்கை, பாய கிறியற்றனின் மற்றும் ஈரல் செயற்பாட்டு சோதனை என்பனவும் நடத்தப்படும். முழுமையான பரிசோதனைகளின் பின் நீரிழிவு எதிர்ப்பு மருந்துகள் வழங்குவதற்கான ஒழுங்குகள் மேற்கொள்ளப்படும். சிகிச்சை ஆரம்பமான பின் ஒவ்வொரு வாரமும் சித்த மருத்துவ மற்றும் நவீன பரிசோதனைகள் மேற்கொள்ளப்படும். 60 மதுமேக நோயாளர்களை இந்த ஆய்வுக்கு உட்படுத்த உத்தேசிக்கப்பட்டுள்ளது.

நீங்கள் வைத்தியசாலைக்கு சமூகம் தரும் முதல் நாளில் உங்களது அனுமதியுடன் உங்களிற்கு சுருக்கமான பரிசோதனை மேற்கொள்ளப்படும். நீங்கள் இவ்வாய்விற்கு உட்படுத்தக் கூடியவராகக் காணப்படின் உங்களிற்கு இவ்வாய்வு தொடர்பாக உங்களிற்குத் தெரிய வேண்டிய சகல விடயங்களும் இவ்வாய்வை மேற்கொள்ளும் மருத்துவரால் உங்களிற்குத் தெளிவுபடுத்தப்படும். நீங்கள் இவ்வாய்வு தொடர்பான சகல விடயங்ளையும் தெளிவாக அறிந்த பின்னர் நீங்கள் இவ்வாய்விற்கு உதவ விரும்பினால் உங்களின் அனுமதியுடன் இவ்வாய்வில் சேர்த்துக் கொள்ளபப்படுவீர்கள். அத்தடன் உங்களது சம்மதத்ததைத் தெரிவிற்கும் ஒப்புதல் கடிதத்திலும் கையெழுத்ததுப் பெறப்படும். இதன் பின்னர் உங்களிற்கு பூரணமான உடல் மற்றும் மண்டல பரிசோதனைகள் நடத்தப்படும். இதற்கு மேலதிகமாக மேற்குறிப்பிடப்பட்ட சிறுநீர்ப் பரீட்சைகளும் ஆய்வுகூட பரிசோதனைகளுக்கும் இலவசமாகச் செய்யப்படும். இப்பரிசோதனைகள் உங்களது நோயின் தன்மையை தீர்மானித்து மருத்துவம் செய்ய உதவுவதுடன் உங்களது உடல் ஆரோக்கியத்தினையும் அளவிட உதவும். உங்களது நோயின் தன்மைக்கு ஏற்ப மருந்துகள் வழங்கப்படுவதுடன் திரும்பவும் 1 வாரத்தின் பின் வைத்தியசாலைக்கு வருகை தருமாறு ஆலோசனை வழங்கப்படும்.

உங்களது முதல் வருகையின் பின்னரான வருகைகளின் போது முதல் நாள் உணவு உண்ட பின்னர் உணவு எதுவும் உண்ணாது (தேனீர் உட்பட) வைத்தியசாலைக்கு சமூகமளிக்க வேண்டும். நீங்கள் வைத்தியசாலைக்கு வருகை தரும் ஒவ்வொரு முறையும் உங்களிற்கு உடல் மற்றும் மண்டல பரிசோதனைகள் மேற்கொள்ளப்படும். அத்துடன் உங்களிடமிருந்து சிறுநீர் இரத்தம் என்பன பெற்றுக்கொள்ளப்பட்டு ஆய்வுகூடப் பரிசோதனைகளும் இலவசமாகச் செய்யப்படும். உங்களது ஒவ்வொரு

வருகையின் போதும் உங்களது நோய்நிலைக்கு ஏற்றவாறு 1 வார காலத்திற்குப் போதுமான (நீங்கள் மறு முறை வைத்தியசாலைக்கு வரும் வரை போதமான) அளவு மருந்துகள் உங்களிற்கு வழங்கப்படுவதுடன் திரும்பவும் 1 வாரத்தின் பின் வைத்தியசாலைக்கு வருகைதருமாறு கேட்டுக் கொள்ளப்படுவீர்கள். இவ்வாறாக 6 வாரங்கள் வரை அவதானிக்கப்படுவீர்கள்.

நீங்கள் செய்ய வேண்டியது என்ன?

மருத்துவரால் உங்களுக்கு வழங்கப்படும் வழிமுறைகளையும் அறிவுரைகளையும் கவனமாகப் பின்பற்ற வேண்டும். உண்ண கூடிய/உண்ண கூடாத உணவுகள் பற்றி உங்களுக்கு அறிவரை வழங்கப்படுவதுடன் இது சம்பந்தமான உணவு அட்டவணையும் உங்களிற்குத் தரப்படும். பொருத்தமான உணவுத் தேர்வுகள், பொருத்தமான உடற்பயிற்சி அல்லது யோகாசனம் (ஆய்வை மேற்கொள்ளம் மருத்துவர் இது தொடர்பாக அறிவுரை வழங்குவார்) மூலமாக உங்களது இரத்தத்தின் சீனியின் அளவை குறிப்பிட்ட அளவில் பேணுவதற்கு முயற்சி செய்வோம். உங்களிற்கு வழங்கப்படும் வாழ்க்கை நடைமுறை சம்பந்தமான அறிவுரைகளையும், உணவுப் பழக்கம் சம்பந்தமான அறிவுரைகளையும் கட்டாயமாகப் பின்பற்றுதல் வேண்டும்.

இந்த ஆய்வின் காலம் அண்ணளவாக 6 வார காலம் ஆகும். சிகிச்சை ஆரம்பித்த பின் பரிசோதனைகள் மேற்கொள்வதற்காகவும், சிகிச்சையைத் தொடர்வதற்காகவும் ஒவ்வொரு வாரமும் (6 வார காலத்திற்கு) தவறாது வைத்தியசாலைக்குச் சமூகமளிக்க வேண்டும் என எதிர்பார்க்கப்படுகிறது.

ஆய்வின் முடிவில் என்ன நடைபெறும் என எதிர்பார்க்கப்படுகிறது?

உங்களது மருத்துவ நிலை அனுமானம் செய்யப்பட்டு மருந்து முகாமைத் திட்டம் தீர்மானிக்கப்படும். அத்துடன் இவ்வாய்வின் இறுதியில் நீரிழிவு மதுமேகம் எனும் நோயினை கண்டறிய பொருத்தமான சித்த மருத்துவ நோய் அறிதல் முறை அல்லது முறைகள் பற்றிய எண்ணக் கரு உருவாகும் என எதிர்பார்க்கப்படுகிறது.

ஆபத்துகள் ஏதாவது உண்டா?

உடல் மற்றும் மண்டல சோதனைகள் நடத்தப்படும் போதும் ஆய்வுகூட பரிசோதனைகளின் போதும் தூய்மையான சூழ்நிலை பேணப்படும். ஆபத்தான சூழ்நிலைகள் ஏற்படக்கூடிய சாத்தியங்கள் இல்லை. ஏதாவது மோசமான சூழ்நிலை ஏற்பட்டு அவசர சிகிச்சை தேவைப்படும் சந்தர்ப்பத்தில் அல்லது மேலதிகமான மருந்துகள் தேவைப்படும் சந்தர்ப்பத்தில் உங்களுக்குத் தேவையான மருத்துவ சிகிச்சை வழங்கப்படும் அல்லது உங்களுக்கு சிகிச்சை அளிக்கக்கூடிய பொருத்தமான இடத்திற்கு நீங்கள் அனுப்பப்படுவீர்கள்.

இவ் ஆய்வில் இருந்து நீங்கள் எப்போது விலகலாம்?

இந்த ஆய்வில் உங்கள் பங்களிப்பானது முற்றிலும் தன்னார்வமானது. நீங்கள் விரும்பினால் எந்த நேரத்திலும் இந்த ஆய்விலிருந்து நீங்கள் வெளியேறலாம். நீங்கள் இவ் ஆய்விலிருந்து வெளியேறினால் உங்களது மருத்துவ கவனிப்போ அல்லது மருத்துவருடனான உங்களது உறவோ எந்த வகையிலும் பாதிப்படையாது.

உங்களது குருதியின் சீனி அளவு கட்டுப்பாட்டு அளவில் இல்லாது மிக அதிகமாகவோ அல்லது மிக குறைவாகவோ இருந்தால், நீங்கள் இன்சுலின் அல்லது வேறு ஏதாவது சீனியின் அளவைக் கட்டுப்படுத்தும் மருந்துகள் பயன்படுத்த வேண்டிய சூழ்நிலை ஏற்பட்டால், நீங்கள் ஏற்கனவே ஏதாவது வேறு ஆய்வில் ஈடுபட்டிருக்கும் சந்தர்ப்பங்களில் உங்களை ஆய்வில் தொடர்த்து பயன்படுத்த முடியாது என ஆய்வை மேற்கொள்ளும் மருத்துவர் தீர்மானிக்கலாம்.

ஆய்விற்கான செலவு எவ்வளவு?

இந்த ஆய்வுக்கான காலப்பகுதியில் மேற்கொள்ளப்படும் எல்லா உடல் மற்றும் ஆய்வுகூட பரிசோதனைகளும் இலவசமாகச் செய்யப்படும்.

நீங்கள் இவ் ஆய்வில் பங்கெடுக்க விரும்பினால் என்ன செய்ய வேண்டும்?

உங்களுக்கு இவ்வாய்வு தொடர்பான எல்லா விடயங்களும் தெளிவுபடுத்தப்பட்டதாகவும் நீங்கள் இவ்வாய்விற்கு சுயவிருப்புடன் சம்மதிக்கின்றீர்கள் என்றும் தெரிவிற்கும் ஒப்புதல் படிவத்தில் கையெழுத்து இடுமாறு கேட்கப்படுவீர்கள். அத்துடன் ஆய்வை மேற்கொள்ளும் மருத்துவரால் வழங்கப்படும் வழிமுறைகளையும், ஆலோசனைகளையும் கவனமாகக் கடைப்பிடிப்பது அவசியமாகும்.

DIETARY REGIMENS – *NEERIZHIVU MADHUMEHAM* (DIABETES MELLITUS)

Dietary regimen: It is preferable to consume 3 main meals and 3 snacks with between 2 main meals.

3 main meals - Breakfast, lunch and dinner

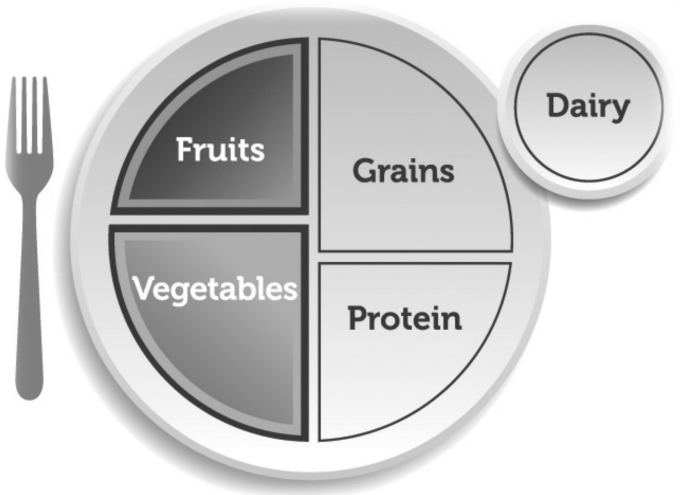
3 snacks – Morning, afternoon and evening

The nutritional goals for management of diabetes for;

- Maintain desirable blood glucose and blood lipid (fat) levels.
- Maintain optimal nutritional status.
- Reach and maintain a healthy weight.

Common pattern of the diabetic meal. As shown in the figure nearest equal portions of grains and vegetables followed by protein foods contents and fruits. In addition low fat dairy products has added with the above diabetic meal plan.

WHO documented that the healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use can prevent or delay the onset of type 2 diabetes. (WHO, 2015)



No.		Foods	Quantity
Intake			
Starch **Each serving from this list contains:** **15 g carbohydrate, 0-3 grams protein,0-1 g fat and 80 calories.** In general, a single serving of starch is: • ½ cup of cooked cereal, grain, or starchy vegetable • 1/3 cup of cooked rice or pasta • 1 oz. of a bread product (such as 1 slice of whole wheat bread) • ¾ to 1 oz. of most snack foods			
01	Millets	Cholam Kambu Thinai Kudiraivali, Varagu Panivaragu Samai Finger millet (ragi) Corn Bran Cereals, cooked (oats, oatmeal) Cereals (unsweetened, ready-to-eat) Rice, cooked (white or brown)	½ cup ¾ cup 1/3 cup
02	Pulses	Chickpeas Beans Peas Lentils	½ cup / 100 g / 3.5 oz. ½ cup / 90 -115 g / 3-4 oz. ½ cup / 55 g / 2 oz. ½ cup / 75 -200 g / 2.5-3.5 oz.
03	Stems	Vazhaithandu	½ cup
04	Underground stems/ Root/ Root tubers	Tuber of lotus (Thamaraikizhangu) Tuber of Kohila (Kokilakizhangu) Potato Baked with skin 3 oz. Boiled, all kinds3 oz. Yam, sweet potato, plain Snack chips (potato chips) Fat-free or baked (¾ oz.) Regular (¾ oz.)	½ cup ½ cup 1 cup ½ cup ½ cup 15-20 9-13
05	Bread and snacks Sweets, Desserts, and other carbohydrates	Bread (whole wheat, white or rye) Biscuit (2 ½ inches across) Cake (frosted, 2-inch square) Cookies (chocolate chip, 2 ¼ inch across) Doughnut (cake, plain, medium, about 1½ oz.)	1 oz. /1 slice 1 1 2

		Ice cream (light or no sugar added) Jam or jelly (regular) Pudding (regular, made with reduced-fat milk) Sports drink Sugar Syrup (light, pancake type) Yogurt (frozen, fat-free) Sugar substitutes (low-calorie sweeteners)	1 1 tbsp ½ cup 1 cup (8 oz) 1 tbsp 1 tbsp 1/3 cup Free
06	Vegetables No starchy vegetable • ½ cup of cooked vegetables or vegetable juice • 1 cup of raw vegetables	Broccoli Carrots Cauliflower Green beans Bean sprouts Cabbage Celery Cucumber Eggplant / Brinjal Drumstick Capsicum Mushrooms Onions Peppers (all varieties) Radishes (mullangi) Tomatoes Salad greens	½ cup Free
07	Fruits **Each serving from this list contains;** **15 grams carbohydrate, 0 grams fat, 0 grams protein and 60 calories.** In general, a single serving of fruit is: • ½ cup of canned or fresh fruit or4 oz unsweetened fruit juice • 1 small fresh fruit (4 oz) • 2 tablespoons of dried fruit		
	Fruits	Apple, raw, unpeeled Banana Berries Blackberries, raw Blueberries, raw Raspberries, raw Strawberries (whole) Cherries Guava Kiwi Mango (small, 5 ½ oz.) Orange (small, 6 ½ oz.) Papaya (cubed, 8 oz.)	2 inches across/small - 1 / 4 oz. Small 1 / 4 oz. ¾ cup ¾ cup 1 cup 1 ¼ cup 3 oz. / 12 number ½ cup Large 1 / 3½ oz. ½ fruit / ½ cup 1fruit ½ fruit / 1 cup

		Pears (fresh, large, 4 oz.) Pineapple, fresh Plums, small Watermelon (cubes, 13 ½ oz.) Avocado (medium, 1 oz.) Dried fruit - Dates	½ fruit ¾ cup 2 1 slice / 1 ¼ cups 2 tbsp 3 medium
08	Milk and milk products **Fat-free (skim) or low-fat (1%) milk andyogurt: Each serving from this list contains 12 grams carbohydrate, 8 grams protein,0-3 grams fat and 100 calories**		
	Milk and milk products	Reduced-fat (1 or 2%) milk and yogurt: Milk, acidophilus milk, Lactaid Yogurt (plain, 6 oz.) (preferable) Whole milk and yogurt: Milk, buttermilk, goat's milk Evaporated milk Yogurt (plain, 8 oz.) Plain soy milk Cheeses (with 3 grams of fat or less per oz) Cottage cheese	1 cup 1 cup 3/4 cup 1 cup ½ cup 1 cup 1 cup 1 oz. ½ cup
09	Meats **Lean meats and protein sources:** **Each serving from this list contains 0 grams carbohydrate, 7 grams protein, 0-3 grams fat and 45 calories.**		
	Meats	Beef (Select or Choice grades, trimmed of fat): Egg whites Fish (fresh or frozen, plain): Catfish, cod, flounder, haddock, halibut, orangeroughy, salmon, tilapia, trout, tuna) Egg Pork (lean) Poultry (with skin or fried) Sausage Processed sandwich meats (With 3 grams of fat or less per oz.)	1 oz. 2 1 oz. 1 oz. 1(limit to 3 per week) 1 oz. 1 oz. 2 oz. / 1/4 cup /1 oz. (with 4-7 grams of fat per oz.) 1 oz.

10	Fats In general, a single serving of fat is: • 1 teaspoon of regular margarine, vegetable oil or butter • 1 tablespoon of regular salad dressing	Nuts Almonds, cashews Peanuts Oil (olive, peanut) Margarine (lower-fat spread) Butter Cream (half and half) Cream cheese (reduced-fat) Cream cheese (regular)	 3 10 1 tsp 1 tbsp 1 tsp 2 tbsp 1 ½ tbsp. 1 tbsp
11	Other		
		Catsup (ketchup) Pickles (medium size dill) Mustard Garlic Spices Carbonated or mineral water, Herbs (fresh or dried)	1 tbsp 1 ½ Free Free Free Free Free

tsp - tea spoon, tbsp. – table spoon

Foods to be chosen and foods to be limited or avoided by Diabetes Mellitus patients

Foods to be chosen	**foods to be limited or avoided**
Whole Grains	
Whole and multi grain breads, whole wheat and brown rice	White breads, croissants, sweet rolls, high-fat white crackers, waffles
Low-fat and multigrain crackers	Short-grain and minute rice – white rice
Low-sugar, whole-grain cereals	Sweetened refined cereals
Oatmeal, bran, bulgur, buckwheat	Commercial muffins, cakes, doughnuts, Danish pastries, high-fat cookies
Low-fat, whole grain baked goods with added bran or oat bran	Avoid 'white' foods (white flour, white sugar)
Vegetables and Fruit – with lots of color	
Dark green leafy vegetables	Parsnip, pumpkin, white potatoes (high GI)
Eat an abundance fresh/frozen vegetables	Dried fruits and fruits in heavy syrup
Unsweetened, fresh, frozen or canned fruits	Sweetened fruit juices
Milk and Alternatives	
Dairy products with less than 1% fat	Milk products higher than 1% fat
Cheese should be 10-20% MF	Cheese higher than 21% MF and creams
Meat and Alternatives	
Fish (canned in water, fresh, frozen), seafood	Fish with butter or breading
Skinless chicken and turkey	Fried chicken, poultry with skin, wings
Lean meats with fat trimmed, wild game	Fatty marbled meats, ribs, regular ground meats, organ meats
Lean cold cuts (but watch the salt content)	High fat processed and canned meats: bacon, sausages, bologna, salami, wieners
Legumes, tofu	
Eggs	

Oils, butter and nuts	
Olive, canola, soybean, sesame, sunflower oils (3 tspor less per day)	Hydrogenated oils, coconut and palm oils
Non-hydrogenated soft margarinesLow-calorie dressings and mayonnaise	Shortening, butter, lard, hard margarines
Light peanut butter, nuts (watch salt and calories)	Peanut butter with palm or hydrogenated fat
Unsalted seeds: flax, pumpkin,sunflower	No more than 1/4 cup nuts per day (high calories)
Defatted gravy and low-sugar condiments	Heavy gravy, cream sauces, high-sugar condiments
Cocoa powder or a small piece of dark chocolate	• Chocolate and carob
Sweets (in very small amounts)	
Sugar substitutes and artificial sweeteners, low sugar jams/jellies/syrups	Sugar and regular jams, jellies, syrups, candies,gelatins, gum, honey
Sugar-free candies, gelatins, gum	Regular cakes, pies, cookies
Low-sugar and high fiber baked goods	No “white” foods (white flour, white sugar)
Low-fat and low-sugar frozen dessert	Regular frozen desserts
Snack Foods	
Popcorn without salt, butter, or hydrogenated oils	Regular popcorn, chips, pretzels, corn chips
Choose low fat, low sugar snack foods	

நீரிழிவு நோயாளர்கள் உண்ண வேண்டிய, அளவோடு உண்ண வேண்டிய, தவிர்க்க வேண்டிய உணவு வகைகள்

உண்ண கூடியவை	அளவோடு உண்ண வேண்டியவை	தவிர்க்க வேண்டியவை
தானிய வகைகள் தவிடு நீக்காத அரிசி கேழ் வரகு ராகி	**தானியவகைகள்** கோதுமை	**கிழங்கு வகை** உருளைக்கிழங்கு சேனைக்கிழங்கு சேப்பங்சகிழங்கு வள்ளிக்கிழங்கு
பருப்பு வகைகள் உளுத்தம் பருப்பு கடலை பருப்பு மைசூர் பருப்பு முளை கட்டிய பயறு		
காய்கறி வகைகள் வாழைப்பூ வாழைத்தண்டு பீர்க்கங்காய் புடலங்காய் வெள்ளை முள்ளங்கி கத்தரிக்காய் பீன்ஸ் வெண்டைக்காய் முட்டை கோஸ் வெள்ளரிக்காய் சௌசௌ கொத்தவரங்காய் முருங்கை காய் பாகற் காய் சுரைக்காய் கோவக்காய் வெங்காயம் பூண்டு பப்பாளிக்காய்	**காய்கறி வகைகள்** கரட் பீட்ருட் பட்டாணி பூசணிக்காய்	
கீரை வகைகள் அரைக்கீரை புதினா கறிவேப்பிலை கொத்தமல்லி குறிஞ்சாக் கீரை குப்பைக் கீரை ஆரைக் கீரை	**பழங்கள்** ஆப்பிள் ஆரஞ்சு சாத்துகுடி கொய்யா பேரிக்காய் பப்பாளி நாவல் பழம்	**புழவகை** மாம்பழம் பலாப்பழம் சப்போட்டபப்பழம் சீத்தாப்பழம் பேரீச்சம்பழம் ஆத்திப்பழம் திராட்சைப்பழம்
அசைவ உணவு சிறிய மீன் முட்டை வென்னைக் கரு	முட்டை	**அசைவ உணவு** ஆட்டிறைச்சி கோழி இறைச்சி முட்டை மஞ்சள் குர
	எண்ணெய் வகை தேங்காய் எண்ணெய் நல்லெண்ணெய் தவிடு எண்ணெய் கடுகு எண்ணெய் ஒலிவ் எண்ணெய்	**எண்ணெய் வகை** நெய் வெண்ணெய் வனஸ்பதி பாமாயில்

சிற்றுண்டி சர்க்கரை சேர்க்காத பிஸ்கட்		**இனிப்பு சிற்றுண்டி** சர்க்கரை தேன் குளுக்கோஸ் ஜாம் வெல்லம் இனிப்பு வகைகள் பிஸ்கட் வகைகள் கேக் இளநீர் குளிர் பானங்கள் (இனிப்பு) மதுபான வகைகள் ஹர்லிக்ஸ் பூஸ்ட் போர்கன்விட்டா காம்பளான்

CASE REPORT FORM I – SCREENING
(Selection of subject)

NO.

1. Institution: Government Siddha Medical College, Palayamkottai, Tamil Nadu.

2. Name of the subject: ..……

3.Address:……

…….……

4. Date of Birth: | | | Age (years): ……

5. Gender: Male | | Female | |

CRITERIA OF INCLUSION - Yes (1), No (0)

6. Age between 18 to 64 years |
7. Sex: Male / Female |
8. Symptoms
   - 8.1Increase volume of urine output (polyuria – nocturnal urea) |
   - 8.2 Immediate changes in weight (weight loss / weight increase) |
   - 8.3 Increase hungry (polyphagia) |
9. Urine glucose – positive |
10. Blood sugar: …….mg/dl / mmol/l |

FBS (≥ 126 mg/dl or 7 mmol/l) or PPBS (≥200mg/dl or 11.1mmol/l)

HbA1C (≥6.5 % or 48 mmol / mol)

11. Patients not taking any anti *Neerizhivu Madhumeham* drugs |

CRITERIA FOR EXCLUSION - Yes (1), No (0)

12. Age below 18 and above 64 years. |

13. Blood sugar – FBS (<126 mg/dl or 7mmol/l) or
PPBS (<200mg/dl or 11.1mmol/l)
HbA1c(<6.5 % or 48 mmol / mol) |

14. Pregnant mothers |
15. Lactating mother |

16. Diabetes with other diseases

17. Patient undergoing regular / irregular treatment for Diabetes

18. Patient undergoing regular treatment for any other severe illness

The patient is eligible / not eligible for the study

Date: ……
Signature of the Investigator: ……

(Lavekar, 2009)

CASE REPORT FORM II – HISTORY

NO.

1. Institution: Government Siddha Medical College, Palayamkottai, Tamil Nadu.

2. Name of the subject:
……..

3.Address:……
…….……

4. Date of | | | Birth: Age (years): ……

5. Gender: Male ☐ Female ☐

6. Educational status: ☐

(Illiterate 0, Read and write 1, School 2, College 3)

7. Occupation: ☐

(Unemployed 0, Desk work 1, Field work 2, Field work with physical laborer 3, Field work with intellectual 4)

8. Total Family members: …….

9. Income per capita per month (in Rs.): ……..

Chief complaint with duration (if any) in days - Absent (0), Present (1) Duration

10. Polyuria (Excessive Urine) ☐ _____
11. Polyphagia (Excessive Hunger) ☐ _____
12. Polydipsia (Excessive Thirst) ☐ _____
13. Exhaustion/Tiredness ☐ _____
14. Loss / increase of body weight ☐ _____
15. Body ache ☐ _____
16. Giddiness ☐ _____
17. Polyneuritis (Numbness / Tingling) ☐ _____

18. Visual disturbance ☐ _____

19. Other ☐ _____

If, yes specify: _____

Personal History

20. Diet ☐
(Vegetarian 0 Non-vegetarian 1 and Lacto-vegetarian 2)

21. Appetite ☐
(Normal 0, low 1 and high 2)

22. Bowel opening ☐
(Difficult 0 and normal 1)

23. Presence of anxiety ☐
(No 0 and Yes 1)

Addiction

24. Smoking ☐
(No 0 and Yes 1)
If yes specify: (a) Quantity (packs): …… (b) Total duration (in years)…….

25. Tobacco chewing ☐
(No 0 and Yes 1)
If yes specify: (a) Quantity: …… (b) Total Duration (in years): ……

26. Alcohol ☐
(No 0 and Yes 1)
If yes specify: (a) Quantity (in ml/day): …… (b) Total Duration (in years): ……

27. Any other (specify): ……..

Family history

28. Present of family history ☐
(No 0 and Yes 1)

PHYSICAL EXAMINATION

29. Height (m): …….. 30. Weight (kg): …….. 31. BMI: ……kg/m^2

32. Body status ☐

(Underweight 0, normal 1, overweight 2 and obese 3)

33. Pulse: rate……../min, rhythm…… volume……
character…… condition of arterial wall……
radio-femoral delay……

34. Blood Pressure (in sitting position): ……..mm Hg

35. Body temperature (^oC): ……

36. Respiration rate: ……. /min

37. Numbness or burning sensation in extremities ☐
(Yes 0, No 1)

37. Signs of dehydration and oedema, if any ……

SYSTEMIC EXAMINATION
No abnormalities detected (NAD) (0) and abnormalities present (1)

38. CVS ☐

If abnormal, details:
……..

39. CNS ☐

If abnormal, details;
……

40. Digestive system ☐

If abnormal, details:
……

41. Uro-Genital system ☐

If abnormal, details:
……..

42. Respiratory system ☐

If abnormal, details:
……..

Date: …… Signature of Investigator: ……

(Lavekar, 2009)

CASE REPORT FORM III- LABORATORY INVESTIGATION

1. Institution: Government Siddha Medical College, Palayamkottai, Tamil Nadu.

2. Name of the subject: ……

3. .Age (years): ……

4. Gender: Male ☐ Female ☐

5. Date of Assessment:

6. Siddha diagnostic methods

6.1 Urine Analysis

6.1.1NeerKuri

6.1.1.1Color ☐
(Yellow 1, Red 2, Black 3, Green 4 and White 5)

6.1.1.2 Smell ☐
(Odour 1 and non odour 0)

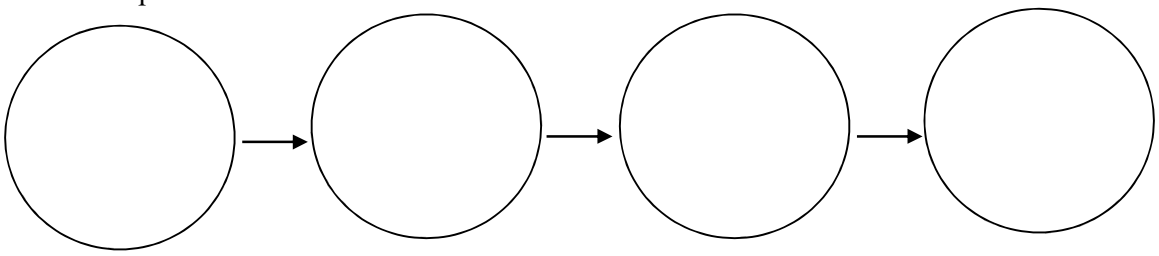
6.1.1.3 Froth ☐
(Present 1and absent 0)

6.1.1.4 Sediment ☐
(Present 1and absent 0)

6.1.1.5 Volume ☐
(< 500 ml 1, 500 -1500 ml 2 and > 1500ml 3)

6.1.2 Neikuri

6.1.2.1 Shape



Immediately immediate after 1 minute immediate after 2 minutes immediate after 3 minutes

6.1.2.2 Nature of the oil spread
(Slow 0 and Quick 1)

6.1.2.3 Whether the oil directly goes inside and touches the bottom of the vessels
(No 0 and Yes 1)

6.2 *Nadi* Analysis

Type of *Naadi*

Right hand: …….

Left hand:…….

6.3Manikkadai

Finger breath of Manikkadai ……

7. Modern diagnostic methods

7.1 Urine examination – UFR

1.1.1 Color ☐

(Straw color 0, Dark yellow 1, Red 2, Brick red 3)

7.1.2 Appearance ☐

(Clear 0, turbid 1)

7.1.3 Specific gravity ☐

(1.0 - 0, 1.005 - 1, 1.010 - 2, 1.015 -3, 1.020 - 4, 1.025 - 5, 1.030 - 6)

7.1.4 Reaction (pH) ☐

(5.0 - 0, 6.0 -1, 6.5 -2, 7.0- 3, 7.5- 4, 8.0 -5, 8.5- 6)

7.1.5 Protein - mg/dl ☐

(Negative - 0, Trace - 1, + - 2, ++ - 3, +++ - 4)

7.1.6 Glucose – mg/dl ☐

(Negative 0, Positive 1)

7.1.7 Ketones ☐
(Negative 0, Positive 1)

7.1.8 Pus cells ☐
(Occasional 0, + - 1, ++ -2, +++ -3)

7.1.9 RBC ☐
(Negative 0, Trace 1, + - 2, ++ -3, +++ -4)

7.1.10 Epithelial cells ☐ hpf
(Present 0 and absent 1)

7.1.11 Casts ☐ hpf
(Present 0 and absent 1)

7.1.12 Urobilinogen ☐
(Present 0 and absent 1)

7.1.13 Bile pigments ☐
(Present 0 and absent 1)

7.1.14 Nitrite
(Present 0 and absent 1) ☐

7.1.15 Crystals
(Present 0 and absent 1) ☐

7.2 Blood

7.2.1 Sugar: …… mg/ml / mmol/l ☐

FBS (≥ 126 mg/dl or 7 mmol/l) or PPBS (≥200mg/dl or 11.1mmol/l – 0)

FBS (<126 mg/dl or 7 mmol/l) / PPBS (<200mg/dl or 11.1mmol/l- 1)

7.2.3 Serum Creatinine: …… mg/dl
(Normal 0, abnormal 1) ☐

7.3 Liver function test

7.3.1 SGOT: …….. IU/L
(Normal 0, abnormal 1) ☐

7.3.2 SGPT: ……... IU/L
(Normal 0, abnormal 1) ☐

Date: …… Signature of Investigator: ……...

(Lavekar, 2009).

CASE REPORT FORM IV- LABORATORY INVESTIGATION
(After intake of anti *Neerizhivu Madhumeham* drugs)

NO.

1. Institution: Government Siddha Medical College, Palayamkottai, Tamil Nadu.

2. Name of the subject:

……

3. .Age (years): ……

4. Gender: Male ☐ Female ☐

5. Name of the medicine: ……..

6. Date of commencement of ☐☐☐☐ treatment:

7. Date of cessation of treatment: ☐☐☐☐

Table 1. Investigation table. After intake of anti*Madhumeha* drug

No. of visits	**BT**	**1**	**2**	**3**	**4**	**5**	**6**
Date of visit							
Investigations							
Urine Analysis (Siddha system)							
NeerKuri							
Color							
Smell							
Froth							
Sediment							
Volume							
Neikuri							
Shape- Immediately							
After 1 minute							
After 2 minutes							
After 3 minutes							
Nature of spreading (quick or slow)							
Direct way + touch the bottom							
Manikkadai							
Nadi							
Urine Analysis (Modern system)							
Appearance							
Specific gravity							
Reaction (pH)							
Glucose							
Blood							
FBS (mg/dL or mmol/L)							
PPBS (mg/dL or mmol/L)							

BT – before treatment

Date: ……

Signature of Investigator: ……..

INSTITUTIONAL ETHICAL COMMITTEE,
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R.No.GSMC/5676/P&D/Res/IEC/2014 **Date: 20.07.2016**

CERTIFICATE OF APPROVAL

Address of Ethical Committee	Government Siddha Medical College, Palayamkottai, Tirunelveli - 627002. Tamil Nadu, India.
Principal Investigator	Dr.Kalaimony rabindrakumar Vidya dharshini, MD(s), 1st Year, PG Dept.of Noi Nadal, Reg. No.:
Guide	Professor. Dr. M. Krishnaveni MD(s), Ph.D, Department of Noi Nadal, Government Siddha Medical College and Hospital, Palayamkottai, Tirunelveli - 627002. Professor. Dr. S.Victoria MD(s), Head, Department of Noi Nadal, Government Siddha Medical College and Hospital, Palayamkottai, Tirunelveli - 627002.
Dissertation Topic	Comparative study of the Siddha diagnostic methods specially *Neerkuri & Neikuri* with modern dignostic methods in ***Neerizhivu madhumeham*** (Diabetes mellitus)
Documents Filed	1) Protocol 2) Data Collection Forms 3)Patient Information Sheet 4) Consent Form
Clinical / Non Clinical Trial Protocol	Clinical Trial Protocol
Informed Consent Document	Yes
Any other Documents	Case Sheet, Investigation Documents
Date of IEC Approval & its Number	GSMC/3-IEC/2016/V-40/20.07.2016

We approve the trial to be conducted in its presented form.

The Institutional Ethical Committee expects to be informed about the process report to be submitted to the IEC at least annually of the study, any changes in the protocol and submission of final report.

Chairman
20/7/2016
(Prof. Dr. M. Logamanian)

Member Secretary
20/7/16
(Prof. Dr. S. Victoria)

GOVERNMENT SIDDHA MEDICAL COLLEGE

PALAYAMKOTTAI

SCREENING COMMITTEE

Candidate Reg no: .....

Department : PG – Noi Nadal (Branch V)

This is to certify that the dissertation topic Comparative study of the Siddha diagnostic methods specially *Neerkuri* & *Neikuri* with modern diagnostic methods in *Neerizhivu madhumeham* (Diabetes mellitus) has been approved by the Screening committee.

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I	Pothu Maruthuvam	Prof.Dr.A Manoharan MD(S)	
II	Gunapadam	Dr.A. Kingsly MD(S) Associate professor	
III	Sirappu Maruthuvam	Prof.Dr.A.S. Poongodikanthimathi MD(S)	
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Pharmacognostical characterization of *Aavarai kudineer* - A poly herbal preparation

Vidya Dharshini K, Mangalambigai V, Krishnaveni M, Muthurathinam S, Saravanan R and Meenakumari S

Abstract
Calibration of drugs and medical preparations are essential parameter in scientific scenario and it helps to improve quality and efficacy of drugs. *Aavarai Kudineer* is a poly herbal Siddha drug and it has been highly prescribing for the condition of *Madhumegam* (Diabetes mellitus). There are number of formulations of *Aavarai Kudineer* documented in literature, whereas scientific studies has not been reported. The current study was design to analyze *Aavarai Kudineer* scientifically for develop a standardization to the formula. Precursor mixture (coarse powder) of *Aavarai Kudineer* and aqueous extract of *Aavarai Kudineer* were tested. Pharmacognostical analysis including preliminary phytochemical study was done. The findings of the study could be useful in diagnostic keys for identification and preparation of aqueous extract of *Aavarai Kudineer*.

Keywords: *Aavarai Kudineer*, hypoglycemic drug, pharmacognostical study, standardization

Introduction
The traditional systems of medicine have received significant popularity in all over the globe as the drugs have curative property, less toxic and minimal side effects [1]. Siddha system of medicine is one of the ancient traditional systems of medicine and it is believed that the Sages laid the foundation for this system. It has great potential of medicinal resource repository goes back to B.C 10 000–B.C 4000 [2]. Ancient Siddha text books documented 4448 variety of diseases included *Madhumegam* [3].

Madhumegam or *Neerilivu* can be compared with diabetes mellitus [4]. It is one of the common metabolic disorder and raised as a global problem as the morbidity of diabetes mellitus increasing day by day [5]. The World Health Organization estimates, there will be 300 million diabetic patients in worldwide by the year of 2025[6]. A number of hypoglycemic herbal drugs and herbal formulations are available in the traditional medicinal practice and they have been widely prescribe by the physicians [5].

Aavarai Kudineer (AK) is one of such poly herbal formulation described in Siddha Materia Medica. The ancient Siddha medical literature the *Theraiyar kudineer* written by the ancient saints describes the constituents and indications of AK. AK is a common drug for diabetes mellitus in the Siddha system of medicine and have been prescribing by the traditional medical institutions. It is comprising of seven medicinal plants namely; leaves of *Senna auriculata* (L.) Roxb. *(Avirai)* and *Cassia fistula* L. *(Kondrai),* Seeds of *Syzygium cumini* (L.) Skeels. *(Naval),* wood of *Salacia reticulate* Wight. *(Kadalazhinjil),* root of *Saussurea lappa* Clarke. *(Koshtam),* rhizome of *Cyperus rotundus* L. (*Koraikizhangu*) and bark of *Terminalia arjuna* (Roxb.) Wight & Arn. (*Marutham*) [7].

Previous studies have shown the multi-dimensional therapeutic properties including hypoglycemic activity of the constitutional plants of AK [5, 6]. A previous *in-vivo* study confirms the anti-hyperglycemic potential of AK [8].

Differences was observed in the constituent plants and parts used to prepare the AKin literature [4-6, 9]. A number of constituent plants of AK is replaced by another plant species; i.e., *Salacia prinoides and Costus spiciosus* were used instead of *S. reticulata* and *S. lappa* respectively [4, 5, 9]. In addition discrepancies were noted with the parts used to prepare AK; i.e., whole plant of *S. auriculata* was used instead of leaves of *S. auriculata* [4], flowers and bark of *C. fistula* used for leaves of *C. fistula* [4, 6, 9] and rhizome of *C. spiciosus* used for instead of *S. lappa* [6].

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Review Article

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WJPMR

COMPARATIVE STUDY OF LOCATIONS OF NADI WITH ANATOMICAL LANDMARKS - A REVIEW

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ABSTRACT

Nadi is a remarkable diagnostic parameter in Siddha system of medicine which is included in *envagaithervu* and well explained by *Siddhars*. User friendly modern diagnostic methods, less number of *Nadi* experts and little number of publish documents has led to non-familiar of *Nadi*. Current study was done to locate the different *Nadi* assessment places and compare the locations with anatomical landmarks. Literature review was done using text books and journals. Various number of *Nadi* locations were documented in the literature. Ten locations of *Nadi* assessment places were mentioned in *Thirumoolar nadi nool* (TNN) and *Yugimuni nadi* (YN) and five locations were noted in *Nadi vagadam* (NV). A discrepancy was noted with the locations of *Nadi* among the text books.Ten places was documented at TNN as *Kuthi santhi* (ankle-posterior tibial artery/dorsalis pedis artery), *Kamiyam* (inguinal region-femoral artery), *Unthi* (epigastric region-abdominal aorta), *Marbu* (chest-precordial impulse), *Kaathu* (ear-posterior auricular artery/superficial temporal artery), *Mooku* (nose-angular artery/facial artery), *Kandam* (neck-common carotid artery), *Karam* (upper limb-axillary artery/brachial artery/ulnar artery/radial artery/princeps pollicis artery), *Puruvam* (eye brow-superficial temporal artery) and *Uchchi* (fontanelle-cerebral artery). *Kaaladi* (sole-medial and lateral plantar artery), *Mulankal* (Knee-popliteal artery), *Mulankai* (elbow-brachial artery) and *Kaikuli* (armpit-axillary artery) were mentioned in YN, even though *Unthi, Kaathu, Mooku and Kamiyam* not documented. *Kai, Kanukkal, Kandam, Kalin peruviral* (big-toe–medial plantar artery) and *Kannichchuli* (fontanelle) were noted in NV. Generally upper limb was used, whereas different locations were documented to assess *Nadi*. Warranting further studies needed to ensure the suitable locations to assess the *Nadi* in clinical practice.

KEYWORDS: *Nadi*, Siddha system of medicine, anatomical landmarks.

INTRODUCTION

Siddha system of medicine is one of the oldest system of medicine in the world, laid by Siddhars (Ivy and Malini, 2010). A number of diagnostic methods have been using in various systems of medicine globally. Siddha system has unique assessment methods as *envagaithervu* (*nadi, sparism, naa, niram, mozhi, vizhi, malam and siruneer*) to diagnosis the diseases (Natarajan, 2009; Shanmugavelu, 1967). *Nadi* is a diagnostic way to assess health status of an individual (Ivy and Malini, 2010) and a remarkable diagnostic parameter, included in *envagaithervu* and well explained by *Siddhars* (Kalaththur kanthasami, 2012).

Tri humours such as *Vatham*, *Pitham* and *Kapham* are the basic principal of Siddha system of medicine, which governs the psycho-biological aspect of the body (Natarajan, 2009). Increases or reduces of the tri humours causes disease (Natarajan, 2009). In a healthy person, the *maathirai* of the *Nadi* of *Vatham* will be one, *Pitham* will be half and the *Kapham* will be quarter (Natarajan, 2009). Derangement of this ratio indicates the disease (Natarajan, 2009). Several locations were indicated to the assessment of the *Nadi* in the Siddha text books, to diagnosis the diseases as well as evaluate the prognosis. User friendly modern diagnostic methods, less number of *Nadi* experts and little number of publish research documents on *Nadi* has led to non-familiar of *Nadi*.Current study was done to locate the different *Nadi* assessment places and compare the locations with anatomical landmarks to create a strong belief regarding old concepts.

MATERIALS AND METHODS

Literature review was done using ancient text books as *Yugimuni nadi* (YN), *Thirumoolar nadi nool* (TNN), *Nadi vagadam* (NV), *Nadi sakkiram* (NS) and journals.

The Tamil Nadu Dr.M.G.R.Medical University

69, Anna Salai, Guindy, Chennai - 600 032.

This Certificate is awarded to Dr/Mr/Mrs. KALAIMONY..RABINDRAKUMAR..VIDYADHARSHINI

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Organized by the Department of Siddha

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DEPT.OF SIDDHA

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NATIONAL SEMINAR ON

"RESEARCH METHODOLOGY AND PUBLIC HEALTH INITIATIVE THROUGH SIDDHA SYSTEM OF MEDICINE"

(RM & PHISSM – 2018)

6TH & 7TH APRIL 2018

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CENTRAL COUNCIL FOR RESEARCH IN SIDDHA
Ministry of AYUSH, Govt. of India

This is to certify that Dr./Shri/Smt. Vidya Dharshini K, GSMC, Palayamkottai has participated/presented a paper entitled.....

..... in the National Seminar on "Research Methodology and Public Health Initiative through Siddha System of Medicine" (RM & PHISSM – 2018) organized by Siddha Regional Research Institute, Thiruvananthapuram on 6th & 7th April 2018 at Dr. M R DAS Convention Centre, Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram, Kerala.

डॉ. ए. कनगराजन / Dr. A. Kanagarajan
Organizing Secretary and Convenor

प्रो.डॉ.आर.एस. रामस्वामी / Prof. Dr. R. S. Ramaswamy
Director General, CCRS

GOVERNMENT SIDDHA MEDICAL COLLEGE & HOSPITAL

PALAYAMKOTTAI

CONTINUING MEDICAL EDUCATION PROGRAMME

CERTIFICATE OF PARTICIPATION

This is to certify that Dr KALAIMONY RABINDRAKUMAR VIDYADHARSHINI has participated in the CME programme held on 25-6-18 at Conference Hall, Special Therapy Wing, Govt. Siddha medical college, Palayamkottai.

This programme is focussed on "Siddha Maruthuva Murai Parisothanaigal"

26/6/18

Prof. Dr. S. Victoria MD(S)

(Head of the department)

27/6/18

Prof. Dr. R. Neelavathy MD(S) PhD

(Principal)